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GOVERNMENT REPORTS

ANNOUNCEMENTS & INDEX

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Rogers C. B. Morton, Secretary
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William T. Knox, Director

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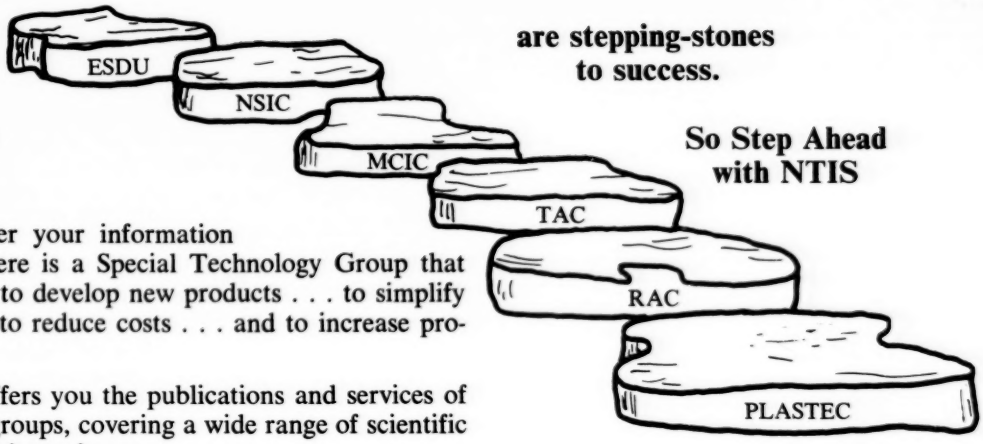

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NTIS Products

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Administration
Agriculture & Food
Behavior & Society
Biomedical Technology & Engineering
Building Technology
Business & Economics
Chemistry
Civil & Structural Engineering
Communication
Computers, Control, & Information Theory
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Subject Field & Group Structure

(Use Edge Index on back cover to locate subject field in the journal)

FIELD 1. AERONAUTICS. Includes the following Groups: Aerodynamics; Aeronautics; Aircraft, Aircraft Flight Control and Instrumentation; Air Facilities.

FIELD 2. AGRICULTURE. Includes the following Groups: Agricultural Chemistry; Agricultural Economics; Agricultural Engineering; Agronomy and Horticulture; Animal Husbandry; Forestry.

FIELD 3. ASTRONOMY AND ASTROPHYSICS. Includes the following Groups: Astronomy; Astrophysics; Celestial Mechanics.

FIELD 4. ATMOSPHERIC SCIENCES. Includes the following Groups: Atmospheric Physics; Meteorology.

FIELD 5. BEHAVIORAL AND SOCIAL SCIENCES. Includes the following Groups: Administration and Management; Documentation and Information Technology; Economics; History, Law, and Political Science; Human Factors Engineering; Humanities; Linguistics; Man-machine Relations; Personnel Selection, Training, and Evaluation; Psychology (Individual and Group Behavior); Sociology.

FIELD 6. BIOLOGICAL AND MEDICAL SCIENCES. Includes the following Groups: Biochemistry; Bioengineering; Biology; Bionics; Clinical Medicine; Environmental Biology; Escape, Rescue, and Survival; Food, Hygiene and Sanitation; Industrial (Occupational) Medicine; Life Support; Medical and Hospital Equipment; Microbiology; Personnel Selection and Maintenance (Medical); Pharmacology, Physiology; Protective Equipment; Radiobiology; Stress Physiology; Toxicology; Weapon Effects.

FIELD 7. CHEMISTRY. Includes the following Groups: Chemical Engineering; Inorganic Chemistry; Organic Chemistry; Physical Chemistry, Radio and Radiation Chemistry.

FIELD 8. EARTH SCIENCES AND OCEANOGRAPHY. Includes the following Groups: Biological Oceanography; Cartography; Dynamic Oceanography; Geochemistry; Geodesy; Geography; Geology and Mineralogy; Hydrology and Limnology; Mining Engineering; Physical Oceanography; Seismology; Snow, Ice, and Permafrost; Soil Mechanics; Terrestrial Magnetism.

FIELD 9. ELECTRONICS AND ELECTRICAL ENGINEERING. Includes the following Groups: Components; Computers; Electronic and Electrical Engineering; Information Theory; Subsystems; and Telemetry.

FIELD 10. ENERGY CONVERSION (Non-propulsive). Includes the following Groups: Conversion Techniques; Power Sources; Energy Storage.

FIELD 11. MATERIALS. Includes the following Groups: Adhesives and Seals; Ceramics, Refractories, and Glasses; Coatings, Colorants, and Finishes; Composite Materials; Fibers and Textiles; Metallurgy and Metallography; Miscellaneous Materials; Oils, Lubricants, and Hydraulic Fluids; Plastics; Rubbers; Solvents, Cleaners, and Abrasives; Wood and Paper Products.

FIELD 12. MATHEMATICAL SCIENCES. Includes the following Groups: Mathematics and Statistics; Operations Research.

FIELD 13. MECHANICAL, INDUSTRIAL, CIVIL, AND MARINE ENGINEERING. Includes the following Groups: Air Conditioning, Heating, Lighting, and Ventilating; Civil Engineering; Construction Equipment, Materials, and Supplies; Containers and Packaging; Couplings; Fittings, Fasteners, and Joints; Ground Transportation Equipment; Hydraulic and Pneumatic Equipment; Industrial Processes; Machinery and Tools; Marine Engineering; Pumps, Filters, Pipes, Fittings, Tubing, and Valves; Safety Engineering; Structural Engineering.

FIELD 14. METHODS AND EQUIPMENT. Includes the following Groups: Cost Effectiveness; Laboratories, Test Facilities, and Test Equipment; Recording Devices; Reliability; Reprography.

FIELD 15. MILITARY SCIENCES. Includes the following Groups: Antisubmarine Warfare; Chemical, Biological, and Radiological Warfare; Defense; Intelligence; Logistics; Nuclear Warfare; Operations, Strategy, and Tactics.

FIELD 16. MISSILE TECHNOLOGY. Includes the following Groups: Missile Launching and Ground Support; Missile Trajectories; Missile Warheads and Fuses; Missiles.

FIELD 17. NAVIGATION, COMMUNICATIONS, DETECTION, AND COUNTERMEASURES. Includes the following Groups: Acoustic Detection, Communications, Direction Finding; Electromagnetic and Acoustic Countermeasures; Infrared and Ultraviolet Detection; Magnetic Detection; Navigation and Guidance; Optical Detection; Radar Detection; Seismic Detection.

FIELD 18. NUCLEAR SCIENCE AND TECHNOLOGY. Includes the following Groups: Fusion Devices (Thermonuclear); Isotopes; Nuclear Explosions; Nuclear Instrumentation; Nuclear Power Plants; Radiation Shielding and Protection; Radioactive Wastes and Fission Products; Radioactivity; Reactor Engineering and Operation; Reactor Materials; Reactor Physics; Reactors (Power); Reactors (Nonpower); SNAP Technology.

FIELD 19. ORDNANCE. Includes the following Groups: Ammunition, Explosives, and Pyrotechnics; Bombs; Combat Vehicles; Explosions, Ballistics, and Armor; Fire Control and Bombing Systems; Guns; Rockets; Underwater Ordnance.

FIELD 20. PHYSICS. Includes the following Groups: Acoustics; Crystallography; Electricity and Magnetism; Fluid Mechanics; Masers and Lasers; Optics; Particle Accelerators; Particle Physics; Plasma Physics; Quantum Theory; Solid Mechanics; Solid-state Physics; Thermodynamics; Wave Propagation.

FIELD 21. PROPULSION AND FUELS. Includes the following Groups: Air-breathing Engines; Combustion and Ignition; Electric Propulsion; Fuels; Jet and Gas Turbine Engines; Nuclear Propulsion; Reciprocating Engines; Rocket Motors and Engines; Rocket Propellants.

FIELD 22. SPACE TECHNOLOGY. Includes the following Groups: Astronautics; Spacecraft; Spacecraft Trajectories and Reentry; Spacecraft Launch Vehicles and Ground Support.

Sample Entries

Report entries are arranged by COSATI group and field. Within fields they are arranged alphanumerically by Accession (Order) Number - alphabetic data precedes numeric.

AD/A-003 266/4GA PC$6.25/MF$2.25
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
PROJECT THEMIS: A CENTER FOR REMOTE SENSING.
Final rept. 16 Sep 67-15 Sep 73,
F.T. Ulaby, and R.K. Moore, Jun 74, 172p Rept no. CRES-TR-133-29 ETL-CR-74-10
Contract DAAK02-68-C-0089
See also AD-743 234.

Descriptors: *Radar mapping, *Target discrimination, Aerial reconnaissance, Data processing equipment, Preprocessing, Microwaves, Ultrasonic radiation, Image Intensification, Backscattering, Agriculture, Vegetation, Land use, Soils, Scattering, Spectrometry.
Identifiers: Themis project, *Remote sensing.

This report summarizes the technical work accomplished under Project THEMIS, A Center for Remote Sensing at the University of Kansas during the period 16 September 1967 through 15 September 1973. The highlights of the four major areas forming the remote sensing system are presented. A detailed description of the latest radar spectrometer results is presented.

Index entries are arranged alphanumerically. Titles are included in all indexes except Contract Number Index. Sample entries for each index follow:

Subject: Entries are sequenced by major subject term, second paired term, and accession number.

RADAR MAPPING
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Personal Author: Entries are sequenced by personal author, report title, and accession number.

MOORE, R. K.
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI

Corporate Author: Entries are sequenced by corporate author name, report number, and accession number. The monitor agency number is given following the report title.

KANSAS UNIV/CENTER FOR RESEARCH INC LAWRENCE REMOTE SENSING LAB
CRES-TR-133-29
Project THEMIS: A Center for Remote Sensing.
(ETL-CR-74-10)
AD/A-003 266/4GI

Contract Grant Number: Entries are sequenced by contract or grant number, corporate author, and accession number.

DAAK02-68-C-0089
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
AD/A-003 266/4GI

Accession/Report Number: Entries are sequenced by accession, report, or monitor agency number. Prices are given in this index.

AD/A-003 266/4GI
Project THEMIS: A Center for Remote Sensing.
AD/A-003 266/4GI 8F **PC$6.25/MF$2.25**

REPORTS & TRANSLATIONS

1. AERONAUTICS

1A. Aerodynamics

AD-A011 689/7GA PC$3.75/MF$2.25
Boston Univ Mass Engineering Labs
Drag on Truncated Circular Cylinders Using Modified Newtonian Theory.
Final rept. 1 Jun 71-31 Dec 74,
Daniel G. Udelson. Jan 75, 26p Rept no. Scientific-1 AFCRL-TR-75-0088
Contract F19628-71-C-0209

Descriptors: *Sounding rockets, *Payload, *Aerodynamic drag, Aerial pickup systems, Drogue parachutes, Slip flow, Hypersonic flow, Cylindrical bodies, Truncation, Atmospheric sounding.

This is the final report of a series investigating the stability and drag characteristics of sounding rocket payloads. The purpose is to study the factors which will allow slowing the vehicle sufficiently to facilitate an air snatch recovery. Geometry is one of the parameters varied by considering truncation of the cylindrical portion of the payload along its longitudinal axis. The present report gives a summary of previous experimental and theoretical work in the series. In addition, simple relations are developed using a modified Newtonian theory to enable prediction of drag in hypersonic flows including those in a rarefied atmosphere.

AD-A011 768/9GA PC$3.75/MF$2.25
Princeton Univ N J Gas Dynamics Lab
Hypersonic Aerodynamics.
Interim rept. 1 Jan 74-1 Jan 75,
S. M. Bogdonoff. May 75, 34p AFOSR-TR-75-0852
Contract F44620-71-C-0032

Descriptors: *Aerodynamic characteristics, *Hypersonic flow, Gas dynamics, Boundary layer flow, Flow separation, Cavities, Turbulence.

The Gas Dynamics Laboratory of the Department of Aerospace and Mechanical Sciences of Princeton University has performed research in experimental and theoretical hypersonic aerodynamics supported by the Air Force Office of Scientific Research. The two areas considered under this study were: (a) Basic hypersonic boundary layer characteristics and (b) Studies of separated flows over cavities. Some considerable progress has been made in these areas. The results obtained during the year are briefly outlined in the following sections. A listing of publications made during the contract period is given in the Appendix.

AD-A011 992/5GA PC$7.00/MF$2.25
Air Force Flight Test Center Edwards AFB Calif
Performance. Volume I. Aerodynamic Theory.
Final rept.
Jan 73, 198p Rept no. AFFTC-TIH-70-1001-Vol-1-Rev
See also Volume 2, AD-A011 993. Supersedes AD-705 584.

Descriptors: *Aircraft, *Flight testing, *Reentry vehicles, *Aerodynamics, Aerodynamic control surfaces, Subsonic characteristics, Supersonic characteristics, Hypersonic characteristics, Aircraft landings, Climbing, Turning flight, Takeoff, Fluid flow, Handbooks.
Identifiers: *Aerodynamic theory.

Contents: Aerodynamic theory; Performance flight testing theory; Performance flight test techniques.

AD-A011 993/3GA PC$6.25/MF$2.25
Air Force Flight Test Center Edwards AFB Calif
Performance. Volume II. Performance Flight Testing Theory.
Final rept.
Jan 73, 168p Rept no. AFFTC-TIH-70-1001-Vol-2-Rev
See also Volume 1, AD-A011 992 and Volume 3, AD-A011 994. Supersedes AD-705 584.

Descriptors: *Aircraft, *Flight testing, *Aerodynamics, Aerodynamic control surfaces, Pitot tubes, Altimeters, Calibration, Aerodynamic characteristics, Turning flight, Fuels, Fluid flow, Flight maneuvers.
Identifiers: *Aerodynamic theory.

This handbook has been compiled by the instructors of the USAF Test Pilot School for use in the performance portion of the School's course. Volume 2 deals specifically with the theoretical basis for performance testing.

AD-A011 994/1GA PC$4.75/MF$2.25
Air Force Flight Test Center Edwards AFB Calif
Performance. Volume III. Performance Flight Test Techniques.
Final rept.
Jan 73, 76p Rept no. AFFTC-TIH-70-1001-Vol-3-Rev
See also Volume 2, AD-A011 993. Supersedes AD-705 584.

Descriptors: *Aircraft, *Flight testing, *Aerodynamics, Flight maneuvers, Flight instruments, Turning flight, Climbing, Level flight, Calibration.

This handbook has been compiled by the instructors of the USAF Test Pilot School for use in the performance portion of the School's course. Volume 3 describes performance flight test techniques developed at the Air Force Flight Test Center, Edwards Air Force Base, California.

AD-A012 094/9GA PC$7.25/MF$2.25
Bell Aerospace Co Buffalo N Y
Wind Tunnel Test Data Report of a Powered 1/5 Scale ARL/Bell V/STOL Aircraft Model. Phase II,
P. E. Ryan, C. Henderson, R. M. Breidenstein, and A. T. Hesby. Dec 69, 214p Rept no. BAC-2353-921003 ARL-69-0236
Contract F33615-67-C-1990

Descriptors: *Vertical takeoff aircraft, *Wind tunnel tests, *Model tests, Aerodynamic characteristics, Stability, Control, Subsonic characteristics, Test facilities, Flaps(Control surfaces), Test methods, Short takeoff aircraft, Thrust augmentation, Hovering, Level flight, Booms(Equipment), Transitions, Angle of attack, Sideslip, Control surfaces, Ejectors.
Identifiers: Scale models.

Tests of a 1/5 scale powered V/STOL aircraft model were conducted in the Langley 7 x 10 wind tunnel. Vehicle aerodynamics and stability and control characteristics were investigated. The test results are presented without analysis.

N75-23477/3GA PC$3.75/MF$2.25
Boston Univ., Mass. Dept. of Aerospace Engineering.
A Finite-Element Method for Lifting Surfaces in Steady Incompressible Subsonic Flow.
L. Morino, and E. Suciu. Dec 74, 38p NASA-CR-142811, TR-74-05
Contract NGR-22-004-030

Descriptors: *Finite element method, *Incompressible flow, *Lifting bodies, *Subsonic flow, *Surfaces, Cartesian coordinates, Integral equations, Steady flow.

For abstract, see STAR 1315

N75-23479/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Experimental Study of the Effect on Span Loading on Aircraft Wakes.
V. R. Corsiglia, V. J. Rossow, and D. L. Ciffone. May 75, 11p NASA-TM-X-62431, A-6064
Conf-Presented at the Aiaa 8TH Fluid and Plasma Dyn. Conf., Hartford, 16-18 Jun. 1975.

Descriptors: *Aircraft wakes, *Turbulent wakes, *Wing loading, *Wing span, Flow visualization, Rolling moments, Wind tunnel tests.

For abstract, see STAR 1315

N75-23480/7GA PC$8.50/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Ground Effects for Jet Lift VTOL.
R. Behnert, R. Roekmojoto, and K. H. Kleppe. May 75, 254p NASA-TT-F-16359
Contract NASW-2481
Tran-Transl. Into English from Ztl-Zukunfts-Technik-Luft Fag 4, Jahresabschlussbericht 1971, Vfw-Fokker (West Germany), 8 Apr. 1971.

Descriptors: *Ground effect, *Lift, *Vertical takeoff aircraft, Jet mixing flow, Two dimensional jets.

For abstract, see STAR 1315

N75-23481/5GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Velocity and Rolling-Moment Measurements in the Wake of a Swept-Wing Model in the 40 by 80 Foot Wind Tunnel.
V. J. Rossow, V. R. Corsiglia, R. G. Schwind, J. K. D. Frick, and O. J. Lemmer. Apr 75, 36p NASA-TM-X-62414, A-5918

Descriptors: *Flow velocity, *Rolling moments, *Swept wings, *Wakes, Aerodynamic loads, Vortex generators, Wind tunnel tests, Wing span.

For abstract, see STAR 1315

N75-23482/3GA PC$4.75/MF$2.25
Nielsen Engineering and Research, Inc., Mountain View, Calif.
Analysis of Wake Vortex Flight Test Data Behind a T-33 Aircraft.
G. D. Kuhn, and R. A. Jacobsen. Apr 75, 80p NASA-CR-137669, NEAR-TR-84
Contract NAS2-6973

Descriptors: *Flight tests, *T-33 aircraft, *Vortices, *Wakes, Flow measurement, Hot-wire anemometers, In-flight monitoring, Longitudinal stability.

For abstract, see STAR 1315

N75-23483/1GA PC$4.25/MF$2.25
Nielsen Engineering and Research, Inc., Mountain View, Calif.
Calculation of Static Longitudinal Aerodynamic Characteristics of STOL Aircraft with Upper Surface Blown Flaps.
M. R. Mendenhall, S. C. Perkin, Jr., F. K. Goodwin, and S. B. Spangler. Apr 75, 63p NASA-CR-137646, NEAR-TR-83
Contract NAS2-8268

Descriptors: *Flaps (Control surfaces), *Longitudinal control, *Longitudinal stability, *Short takeoff aircraft, Aerodynamic characteristics, Aircraft configurations, Thrust control.

For abstract, see STAR 1315

Field 1—AERONAUTICS

Group 1A—Aerodynamics

N75-23484/9GA PC$4.25/MF$2.25
Wichita State Univ., Kans.
Effectiveness of Spoilers on the Ga(W)-1 Airfoil with a High Performance Fowler Flap.
W. H. Wentz, Jr.. May 75, 70p NASA-CR-2538
Contract NGR-17-002-072

Descriptors: *Airfoils, *Spoilers, *Wing flaps, Drag, Graphs (Charts), Hysteresis, Turbulence effects, Vortex generators, Wind tunnel models.

For abstract, see STAR 1315

N75-23485/6GA PC$10.50/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Airframe/Propulsion Interference.
Mar 75, 419p AGARD-CP-150
Conf-Presented at the Fluid Dyn. Panel Symp., Rome, 3-6 Sep. 1974.
In English; Partly in French.

Descriptors: *Aerodynamic interference, *Air intakes, *Airframes, Afterbodies, Aircraft design, Interference drag.

For abstract, see STAR 1315

N75-23514/3GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Effect of Wing Planform and Canard Location and Geometry on the Longitudinal Aerodynamic Characteristics of a Close-Coupled Canard Wing Model at Subsonic Speeds.
B. B. Gloss. Jun 75, 86p NASA-TN-D-7910, L-9987

Descriptors: *Canard configurations, *Subsonic speed, *Wing planforms, Angle of attack, Leading edges, Wind tunnel models.

For abstract, see STAR 1315

N75-23602/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Transonic off-Design Drag and Performance of Three Mixed-Compression Axisymmetric Inlets.
R. R. Woollett, E. T. Meleason, and D. A. Choby. Jun 75, 50p NASA-TM-X-3215, E-8146

Descriptors: *Drag measurement, *Supersonic inlets, *Transonic speed, Aerodynamic coefficients, Cowlings, Flow deflection, Performance tests, Spilling, Supersonic drag.

For abstract, see STAR 1315

N75-23607/5GA PC$3.75/MF$2.25
Cranfield Inst. of Technology (England). Flight Div.
The Influence of Short Springs on Longitudinal Static Stability.
M. E. Eshelby. Mar 75, 41p CRANFIELD-AERO-29

Descriptors: *Aircraft stability, *Longitudinal stability, *Springs (Elastic), Flight tests, Stability tests.

For abstract, see STAR 1315

N75-23610/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Comparison of Flight Measurements with Predictions from Aeroelastic Models in the NASA Langley Transonic Dynamics Tunnel.
W. H. Reed, Iii. May 75, 11p NASA-TM-X-72686
Conf-Presented at the 46TH AGARD Flight Mech. Panel Symp. On Flight/Ground Facility Correlation, Valloire, France, 9-12 Jun. 1975.

Descriptors: *Aeroelasticity, *Aerospace vehicles, *Dynamic structural analysis, *Flight tests, *Transonic wind tunnels, *Wind tunnel models, Aerodynamics, Buffeting, Freon, Gust loads, Transonic flutter.

For abstract, see STAR 1315

N75-24032/5GA PC$4.25/MF$2.25
Boeing Aerospace Co., Seattle, Wash.
Design and Fabrication of Rene 41 Advanced Structural Panels.
B. E. Greene, and R. F. Northrup. 1975, 59p
NASA-CR-132646
Contract NAS1-10749

Descriptors: *Axial compression loads, *Bending moments, *Rene 41, *Shear stress, *Wing panels, High temperature research, Load distribution (Forces), Performance tests, Product development.

For abstract, see STAR 1315

1B. Aeronautics

AD-A011 728/3GA PC$9.50/MF$2.25
Lockheed-Georgia Co Marietta
Evaluation of the Flying Qualities Requirements of MIL-F-8785B (ASG) Using the C-5A Airplane.
Final rept. Sep 74-Mar 75,
Charles L. Silvers, and Clifton C. Withers. 20 Mar 75, 333p AFFDL-TR-75-3
Contract F33615-75-C-3012

Descriptors: *Flight envelope, *Jet transport planes, *Specifications, Military aircraft, Flight testing, Flight maneuvers, Subsonic flight, Mission profiles, Flight control systems, Angle of attack, Stability, Aeronautics, Subsonic characteristics.
Identifiers: C-5A aircraft, C-5 aircraft, Compliance testing, Evaluation.

The study was conducted to validate military specification MIL-F-8785B(ASG), 'Flying Qualities of Piloted Airplanes,' dated 7 August 1969, Interim Amendment-1 (USAF), dated 31 March 1971, by performing a detail comparison of its requirements with the known characteristics of the Lockheed C-5A and pilot comments on them. The comparison was based primarily on existing flight test data supplemented by analytical data as required for this evaluation process. Paragraph by paragraph validations of discrepancies are noted, resolution attempted if necessary, and any recommendations given. In addition, recommendations are made enumerating experimental and analytical investigations beyond the scope of this study which will provide data for further validation and updating of the requirements.

AD-A011 936/2GA PC$4.25/MF$2.25
Andrews Univ Berrien Springs Mich
Dispersal of Seagulls in an Airdrome Environment.
Final rept. 31 Dec 72-31 Jan 75,
John F. Stout, Wm. Humphrey Gillett, James L. Hayward, Jr., and Charles J. Amlaner, Jr. Jun 75, 61p AFWL-TR-74-324
Contracts F29601-73-C-0063, F44620-67-C-0063

Descriptors: *Aviation safety, *Bird strikes, *Airports, Hazards, Reduction, Birds, Models, Effectiveness, Collision avoidance.
Identifiers: Shemya Air Force Base, Gulls.

Glaucous-winged Gulls (Larus Glaucescens) provide an acute bird/aircraft hazard at Shemya Air Force Base, Shemya Island, Alaska. The problem was evaluated by making survey counts of aggregations of gulls on the island. At Ellington Air Force Base, TX, Ring-billed Gulls (Larus delawarensis) often aggregate in large groups on or near the active runways and are hazardous to aircraft. Recorded gull calls played to aggregations of Glaucous-winged Gulls at Shemya AFB showed that the Distress call resulted in fewer birds remaining following playback than any other call. Distress calls played back to aggregations of Ring-billed Gulls near Ellington AFB were also effective in dispersal. The effectiveness of sound and artificial model gulls was evaluated in a breeding colony and a non-breeding colony. A number of bird species other than those specifically studied should be considered small-potential hazards to aircraft at the bases.

AD-A012 101/2GA PC$3.25/MF$2.25
Biotechnology Inc Falls Church Va
Biomedical and Human Effectiveness Issues in Projected Naval Aviation Programs. Part II. Implications of Prisoner of War Data,
Martin G. Every, and James F. Parker, Jr. Jan 75, 9p
Contract N00014-73-C-0052

Descriptors: *Naval aviation, *Aviation safety, *Aeronautical engineering, Warfare, Escape systems, Survival(Personnel), Data acquisition, Rescues, Damage assessment, Naval planning, Ejection seats, Aviation injuries, Prisoners of war, Vulnerability.
Identifiers: Nonautomatic survival equipment.

The report is the personal experience data of naval aviators held as prisoners of war during the Southeast Asia conflict. Prisoner of war data provide a unique source of biomedical planning information, since the conditions and stresses found in a combat mishap are unlike those of the noncambat aviation accident. These differences often are directly responsible for the type and degree of injuries, and thus have a definite bearing on the effectiveness and adequacy of escape, survival, and rescue equipment.

AD-A012 223/4GA PC$4.25/MF$2.25
Coast Guard Washington D C
SAR Study of Eastern Airlines Flight 401 Crash.
6 Mar 74, 72p

Descriptors: *Aviation accidents, Crash landing, Sea rescues, Coast Guard, Medical services, Readiness, Ambulances, Swamps, Night flight, Commercial aircraft, Passenger aircraft.
Identifiers: L-1011 aircraft.

At approximately 2340R 29 December 1972, Eastern Airlines Flight 401, a Lockheed 1011, with 178 persons on board, crashed in the Everglades 18 miles west of Miami International Airport. The aircraft was completely demolished, with wreckage, bodies, and survivors strewn over a wide area. Because of the magnitude of the rescue operation and of the medical emergency caused the study resulted in a number of recommendations concerning preparations for Coast Guard response to future cases of this magnitude. The study and the action to be taken thereon are considered of servicewide interest.

AD-A012 234/1GA PC$7.00/MF$2.25
Bell Helicopter Co Fort Worth Tex
An Investigation of High-G Maneuvers of the AH-1G Helicopter.
Technical rept.,
James R. Van Gaasbeek. Apr 75, 180p
USAAMRDL-TR-75-18
Contract DAAJ02-73-C-0092

Descriptors: *Helicopters, *Flight maneuvers, Gunships, Maneuverability, Aerodynamics, Computer applications, Statistical analysis.
Identifiers: H-1 aircraft, AH-1G aircraft, Huey Cobra.

The high-g maneuver capabilities of the AH-1G have been investigated in this effort. Flight test data for 132 high-g maneuvers have been studied and statistically analyzed to determine the relationships among the variables. A series of fixed-collective symmetric pullups was simulated, using the Rotorcraft Flight Simulation Program C81, to determine the mechanisms limiting high-g maneuvers of the AH-1G. Statistical analysis of the C81 data was used to supplement the analysis of the test data. Three additional maneuvers, similar to the most severe test maneuvers, were simulated.

1C. Aircraft

AD-A011 725/9GA PC$4.75/MF$2.25
Acurex Corp Mountain View Calif Aerotherm Div
Exploratory Development of Heat Resistant and Nonflammable Fibrous Materials.
Final rept. 1 Apr-30 Jun 74,
Bernard Laub, Edward Chu, and Kimble J. Clark. Feb 75, 78p Rept no. Aerotherm-FR-74-116 AFML-TR-74-233
Contract F33615-74-C-5022

Descriptors: *Aircraft fires, *Parachute fabrics, *Flammability, Jet engine fuels, Fire resistant textiles, Thermal degradation, Thermal resistance, Permeability, Computer programming.
Identifiers: JP-4 fuel.

An analytical study was performed to evaluate potential improvements in the thermal survivability of parachutes upon exposure to aircraft crash fires. Principal findings were that significant improvements in thermal survivability are achievable only through the use of advanced materials which, potentially, can provide survival into the flame zone. The investigation of possible design modifications indicated that alteration of fabric weight and optical properties can improve material thermal performance whereas alterations of fabric permeability are ineffective.

AD-A011 726/7GA PC$4.25/MF$2.25
Calspan Corp Buffalo N Y
In-Flight Testing of a Fault-Tolerant Multiplex System in the NC-131H Total In-Flight Simulator.
Final rept. Mar-May 74,
James N. Dittenhauser, and J. Victor Lebacqz. Oct 74, 75p Rept no. CALSPAN-AK-5280-F-4 AFFDL-TR-74-110
Contract F33615-73-C-3051
See also report dated Mar 73, AD-774 049.

Descriptors: *Cargo aircraft, *Fly by wire control, *Multiplexing, Data links, Flight control systems, Redundant components, Fiber optics, Flight testing.
Identifiers: C-131 aircraft, NC-131 H aircraft.

An eight hour flight test program was conducted using the USAF Total In-Flight Simulator (TIFS) airplane to evaluate the performance of a Hughes Aircraft Company Fault-Tolerant Digital Airborne Data System (F-DADS). Multiplex links consisting of twisted shielded wires, fibre optics, and a microwave dielectric bus were investigated for their potential usefulness. The multiplex system was used successfully to transmit pilot control signals and autopilot feedback signals for all three data links with the TIFS airplane operating in a 'fly-by-wire' mode.

AD-A011 727/5GA PC$7.00/MF$2.25
Honeywell Inc Minneapolis Minn Government and Aeronautical Products Div
Development of a Hydrofluidic Stabilization Augmentation System (HYSAS) for an AX Class Aircraft.
Final rept. Dec 72-Nov 74,
Holger C. Kent. Jan 75, 176p AFFDL-TR-74-147
Contract F33615-73-C-3068

Descriptors: *Tactical aircraft, *Flight control systems, *Fluidic control, Hydraulic servomechanisms, Yaw, Closed loop systems, Fluidic amplifiers, Analog simulation.
Identifiers: AX aircraft, *Stability augmentation.

This program consisted of the design, development, fabrication, and evaluation of a Hydrofluidic Yaw Axis Stability Augmentation System (HYSAS). The objective was to develop a low cost, reliable, lightweight, flightworthy HYSAS with moderate performance and low-field maintenance characteristics compared to an electro-hydraulic SAS for jet powered AX class tactical aircraft. A system analysis was conducted that included a computer simulation of the Fairchild Aircraft Co. A-10 aircraft. From the results of the computer simulation, a yaw damper configuration was determined that improved flying quality characteristics by increasing dutch roll damping throughout the flight envelope of the AX Class Tactical Aircraft (AXCTA).

AD-A011 772/1GA PC$9.25/MF$2.25
Teledyne Ryan Aeronautical Co San Diego Calif
Composite Maneuver Augmentation (COMMA) For Fighter Aircraft: Preliminary Design Study.
Technical rept.,
Robert B. Chisman. Jan 74, 314p Rept no. TRA-30120-1 AFFDL-TR-73-143
Contract F33657-73-A-0056-0005

Descriptors: *Drones, *Wing body configurations, Structural mechanics, Thermodynamics, Flight control systems, Jet flaps, Aerodynamics, Interfaces.
Identifiers: BQM-34 drones, BQM-34F drones, Firebee.

The Air Force Flight Dynamics Laboratory plans to test an advanced composite wing with an internally blown jet flap on a low cost, low risk unmanned vehicle. This technical report identifies required modifications to the BQM-34F target vehicle, including the engine and wing interface constraints, to support the flight test program. Emphasis was given to the fuselage structure, elevator control power, bleed air valve and ducting, flight control system, vehicle electrical system, and the instrumentation and telemetry systems. AFFDL provided the wing definition and jet flap wind tunnel test data.

AD-A011 928/9GA PC$4.75/MF$2.25
Advanced Technology Center Inc Dallas Tex
Design Studies of Transonic and STOL Airfoils with Active Diffusion Control.
Final rept. 19 Apr 73-19 Jun 74,
C. H. Haight, T. D. Reed, and B. T. Morland. 19 Jun 74, 85p Rept no. ATC-B-94300/4CR-24
Contract N00019-73-C-0426

Descriptors: *Supercritical airfoils, *Transonic characteristics, Boundary layer control, Short takeoff aircraft, Vortices, Diffusers, Air entrainment, Potential flow.

Results of parametric design studies are presented for supercritical airfoils which employ active diffusion control. Efforts were concentrated on two basically different airfoil profiles. One type of airfoil has a 6% thickness to chord ratio and employs an antiseparation tailored contour (ATC) located in the forward, lower surface. This type of airfoil is considered to be a promising candidate for improving the transonic performance of combat aircraft. The second type of airfoil is 12% thick and has an ATC within the aft, upper surface. This type of wing section is applicable to transonic transports and is compatible with previous STOL designs which employ ATC's. Theoretical analyses indicate both airfoils have large values of the transonic cruise parameter, good transonic lift characteristics, and, in general, offer improved transonic performance.

AD-A011 999/0GA PC$3.75/MF$2.25
Instrument Flight Center Randolph AFB Tex
High Acceleration Cockpit Mockup Evaluation.
Final rept.,
Vibert L. Strock, Jr. May 75, 26p Rept no. IFC-TR-75-1

Descriptors: *Jet fighters, *Cockpits, *Human factors engineering, High acceleration, Flight instruments, Instrument panels, Flight simulators, Pilots, Physiological effects.

The Research and Development Division of the USAF Instrument Flight Center conducted a pilot factors evaluation of a high acceleration cockpit mockup to determine its utility/suitability. The cockpit evaluation was performed by 12 subject pilots with previous fighter aircraft experience. From the subject pilots' comments and responses to postflight questionnaires, the high acceleration cockpit concept was generally highly acceptable for advanced fighter aircraft. Various areas of the concept are identified as requiring further study and development.

AD-A012 001/4GA PC$4.25/MF$2.25
Instrument Flight Center Randolph AFB Tex
Helicopter Display Improvement Study.
Final rept.,
William E. Clark, Jr., and Gabriel P. Intano. May 75, 67p Rept no. IFC-TN-75-1

Descriptors: *Helicopters, *Flight instruments, *Display systems, Flight control systems, Attitude indicators, Instrument panels, Human factors engineering, Pilots, Questionnaires, Reaction(Psychology).

This Technical Note, IFC-TN-75-1, presents the results of the USAF Instrument Flight Center Helicopter Display Improvement Study (CDG-PFH-1). A representative cross-section of active duty Air Force Helicopter Pilots were sampled by means of a questionnaire. The returned questionnaires provide a data base of approximately 20% of the active helicopter force. Pilots responded to questions directed at their current instrument panels, as well as future panel designs with instrument location, lighting, and operation being addressed. Specific displays were also treated in that pilots were asked to rate their attitude indicators, altimeters, heading indicators and airspeed displays. The desirability of stability augmentation systems, as well as the priority the pilots place on augmenting the various axes is also established. The remaining questions treated helicopter flight directors, tape displays, navigation systems and the control and performance concept of instrument flying.

AD-A012 028/7GA MF$2.25
Bell Aerospace Co Buffalo N Y
V/STOL Employing ARL Thrust Augmentation Concepts - Research Test Vehicle Configuration Summary and Design Technology Report.
Technical rept. 17 Jul 67-17 Dec 68,
C. Henderson. Dec 68, 434p Rept no. BAC-2353-953010 ARL-68-0356
Contract F33615-67-C-1990
See also AD-A012 092.
Availability: Available in microfiche only.

Descriptors: *Vertical takeoff aircraft, *Short takeoff aircraft, *Thrust augmentation, Turbofan engines, Bypass engines, Ejectors, Configuration, Flight control systems.
Identifiers: *High bypass ratio.

The results of a detailed preliminary design study of a V/STOL research test vehicle (RTV), employing ARL thrust augmentation concepts, are presented. The V/STOL research airplane uses a high by-pass ratio turbofan engine with ejector thrust augmentation in the wing and fuselage nose. Design layouts of all major con-

figuration components and systems are presented together with results of analytical investigations and trade-off studies.

AD-A012 091/5GA PC$5.25/MF$2.25
Rand Corp Santa Monica Calif
Cost-Estimating Relationships for Aircraft Airframes,
G. S. Levenson, H. E. Boren, Jr., D. P. Tihansky, and F. Timson. Feb 72, 119p Rept no. R-761-PR (Abridged)
Contract F44620-67-C-0045

Descriptors: *Airframes, *Cost estimates, Scientific research, Labor, Manufacturing, Engineering, Tools, Accounting, Statistical analysis, Computer programs, FORTRAN.
Identifiers: Design, Sensitivity analysis.

This report presents generalized cost-estimating relationships for estimating development and production costs of aircraft airframes in a long-range planning context. It provides separate estimating equations for the following cost elements: engineering, development support, flight test operations, tooling, manufacturing labor, manufacturing material, and quality control. An additional set of estimating equations is presented for prototype development.

AD-A012 092/3GA PC$7.50/MF$2.25
Bell Aerospace Co Buffalo N Y
V/STOL Employing ARL Thrust Augmentation Concepts. Vol. 1,
C. Henderson. 17 May 68, 249p Rept no. BAC-2353-933005 ARL-68-0355
Contract F33615-67-C-1990
See also AD-A012 028.

Descriptors: *Short takeoff aircraft, *Vertical takeoff aircraft, *Thrust augmentation, Turbofan engines, Bypass engines, Ejectors, Configuration, Flight control systems.
Identifiers: *High bypass ratio.

The application of ARL thrust augmentation concepts to a V/STOL transport and a tactical aircraft has been investigated. The augmentor system utilizes the exhaust of turbofan engines to power the ejector. Interim results are presented.

AD-A012 215/0GA PC$4.75/MF$2.25
Goodyear Aerospace Corp Litchfield Park Ariz Arizona Div
Window Contoured Glass/Plastic Transparent Armor for the UH-1D Helicopter.
Final rept. 4 Jan 73-20 Jan 75,
Wilson C. McDonald , and Richard A. Huyett.
May 75, 81p Rept no. GERA-2074 AMMRC-CTR-75-12
Contract DAAG46-73-C-0075

Descriptors: *Helicopters, *Windshields, *Glass reinforced plastics, Armor, Laminates, Ballistic testing, Impact tests, Windows.
Identifiers: *Transparent armor, *Ballistic impact, H-1 aircraft, UH-1 aircraft.

The objectives of this program relate to the design of a transparent armor installation for the UH-1D helicopter. This effort incorporated for the first time significant amounts of high performance glass/plastic laminate armor in an aircraft. Eight slipsets of armor were produced, one of which was installed and flight tested. Environmental testing was also conducted to define armor performance and characteristics.

AD-A012 219/2GA PC$3.75/MF$2.25
Goodyear Aerospace Corp Litchfield Park Ariz Arizona Div
UH-1 Ballistic and Bird Impact Test Study.
Final rept. 16 Aug 74-16 Jan 75,
Wilson C. McDonald, and Richard A. Huyett.
Apr 75, 48p Rept no. GERA-2075 AMMRC-CTR-75-7
Contract DAAG46-75-C-0005

Descriptors: *Helicopters, *Windshields, *Bird strikes, Ballistic testing, Impact tests, Acrylic resins, Polycarbonates, Composite materials, Spallation, Penetration, Impact strength.
Identifiers: *Ballistic impact, H-1 aircraft, UH-1 aircraft.

This program concerns the ballistic and bird impact testing of UH-1 windshields of three different designs. These designs included an acrylic windshield (which was used as the standard), a monolithic polycarbonate windshield with abrasion coating on both surfaces, and a glass-plastic composite using chemically strengthened glass (Chemcor) as the other glass ply.

AD-A012 225/9GA PC$5.75/MF$2.25
United Technologies Corp Stratford Conn Sikorsky Aircraft Div
Helicopter Maintenance Effectiveness Analysis.
Final rept.,
Calvin Holbert, and Gary Newport. May 75, 132p USAAMRDL-TR-75-14
Contract DAAJ02-73-C-0029

Descriptors: *Helicopters, *Maintenance, Maintenance personnel, Maintainability, Maintenance equipment, Diagnosis(General), Military training, Questionnaires.
Identifiers: H-47 aircraft, CH-47C aircraft, H-54 aircraft, CH-54B aircraft, H-1 aircraft, UH-1H aircraft.

A study has been made of U.S. Army maintenance operations to determine the significance of repetitive maintenance and incorrect diagnoses in regard to U.S. Army maintenance efficiency. A questionnaire was distributed to Army maintenance personnel to solicit their views on maintenance efficiency. In addition, Army aircraft inspection and maintenance data (DA Form 2408-13 and Operations Reliability Maintainability Engineering Data) were reviewed to quantify the number of repetitive maintenance actions. These data included maintenance personnel and maintenance actions for the UH-1H, Ch-47C, and CH-54B model helicopters.

AD-A012 229/1GA PC$3.25/MF$2.25
Army Aviation Systems Command St Louis Mo
Major Item Special Study (MISS), UH-1H Main Rotor Damper Assembly.
Interim rept. Jan 64-Jun 74.
Apr 75, 21p Rept no. USAAVSCOM-TR-75-2

Descriptors: *Helicopters, *Helicopter rotors, *Value engineering, Logistics support, Quality control, Spare parts, Maintenance, Maintainability, Cost analysis, Failure.
Identifiers: H-1 aircraft, UH-1H aircraft, *Logistics management, Failure analysis, MISS(Major Item Special Studies), Major item special studies.

Major Item Special Study (MISS) reports are performed on DA Form 2410 reportable components. These are time change items and certain condition change items selected because of high cost or need for intensive management. Basically, the MISS reports are concerned with analyzing reported removal data presented in the Major Item Removal Frequency (MIRF) report. The failure modes reported for each removal are examined and grouped into categories which are intended to clarify the intent of the data reporting. From this data, removal distribution can be plotted and an MTR (mean time to removal) can be calculated. The MISS reports then investigate possible cost savings based on total elimination of selected failure modes. These modes are chosen because of the percentage of failures they represent and/or because they appear to be feasible Product Improvement Program (PIP) areas.

AD-A012 233/3GA PC$8.75/MF$2.25
Bell Helicopter Co Fort Worth Tex
Flight Control System Reliability and Maintainability Investigations.
Final rept.,
John Zipperer, Gavin Jenney, and Jerry Bryant.
Mar 75, 290p USAAMRDL-TR-74-57-FR
Contract DAAJ02-73-C-0026
See also Appendix F dated Mar 75, AD-A009 156.

Descriptors: *Helicopters, *Flight control systems, Fly by wire control, Fluidic control, Maintainability, Reliability, Specifications, Handbooks.

Army helicopter nonrotating flight control system specifications, standards, and design handbooks were reviewed for areas in which improvements could be made to requirements affecting system and mission reliability and maintainability. R and M requirements were essentially missing from all documents reviewed, and therefore specific requirements were added for reliability, maintainability, and supporting workmanship, qualification, and production acceptance. Special emphasis was directed toward requiring those distributional material properties, failure and maintenance time data, and analytical methods which permit 'Design for Reliability (Probabilistic Design) and Maintainability' directly into components and thus into the flight control system.

AD-A012 236/6GA PC$6.25/MF$2.25
Boeing Vertol Co Philadelphia Pa
Engine/Transmission/Airframe Advanced Integration Techniques.
Final technical rept.,
Theodore Himka, and Richard D. Semple. May 75, 170p Rept no. D210-10900-1 USAAMRDL-TR-75-16
Contract DAAJ02-74-C-0043

Descriptors: *Helicopters, *Base lines, Integrated systems, Helicopter engines, Airframes, Transmissions(Mechanics), Fuel systems, Ingestion(Engines), Army aircraft.

Innovative engine/transmission/airframe integrated design concepts were developed to provide total airflow and power management for a utility transport helicopter which meets projected requirements of future Army aircraft. These requirements include engine compartment cooling, drive train and transmission oil cooling, engine oil cooling, exhaust plume and hot metal infrared (IR) signature suppression, and engine inlet foreign particle protection.

AD-A012 246/5GA PC$4.25/MF$2.25
Air Force Special Weapons Center Kirtland AFB N Mex
BQM-34A Target Drone Operational Decision Model Validation Study,
Jon P. Kahler, and Roger E. Christensen. Jun 75, 55p Rept no. AFSWC-TR-75-47

Descriptors: *Target drones, *Weather, Remotely piloted vehicles, Costs, Reduction, Decision making, Weather forecasting, Losses, Countermeasures, Recovery, Wind velocity, Launching, Climate, Optical tracking, Efficiency, Cost effectiveness, Missions.
Identifiers: *Firebee, Decision models, Climatology.

An Operational Decision Model (ODM) is a way of maximizing the operational utility of a weather sensitive system while minimizing long term average costs. This report evaluates the application of ODMs to an RPV operation. Specifically, it compares launch decisions made with standard decision criteria with

launch decisions made by three ODMs developed from BQM-34A operational cost data as a function of important categories of weather and Holloman AFB records of the past occurrences of these weather categories. Potential savings were determined by using independent weather observations for Holloman AFB for the months of October, November, and December for 1973 and 1974 in the ODMs. Results showed that the ODMs always saved money in the long run. In one instance, average savings were as high as $10,000 per successful mission. The study concludes that consistent use of ODMs can increase the productivity of weather sensitive RPVs by allowing for more successful missions, in less time, at lower costs. (Author)

AD-A012 270/5GA PC$6.25/MF$2.25
Ultrasystems Inc Phoenix Ariz Dynamic Science Div
Helicopter Troop/Passenger Restraint Systems Design Criteria Evaluation.
Final rept. 1 Jun 73-1 Apr 75,
Richard W. Carr. Jun 75, 153p USAAMRDL-TR-75-10
Contracts DAAJ02-73-C-0077, DAAJ02-74-C-0034

Descriptors: *Army aircraft, *Safety belts, *Helicopters, Restraint, Protection, Safety, Aircraft seats, Aerodynamic loading, Military requirements, Specifications, Test methods.
Identifiers: Design.

A systems analysis of a new restraint systems for troop restraint systems in helicopters was conducted. Hardware was designed and statically tested in accordance with the requirements of two proposed specifications. Design iterations were required on some hardware components, and three designs to be dynamically tested were developed. Dynamic testing of the restraint systems revealed additional weaknesses, design modifications were incorporated, and testing was reconducted until satisfactory results were obtained. The proposed specifications were modified and refined in accordance with the test results, with the net effect that the two specifications as they now stand define advanced restraint systems providing optimum restraint for occupants of Army aircraft which can be built within existing state of the art, are low in weight, and have reasonable cost.

AD-A012 292/9GA PC$7.00/MF$2.25
Raven Industries Inc Sioux Falls S Dak
POBAL-S, The Analysis and Design of a High Altitude Airship.
Final rept. Oct 72-Mar 75,
Jack D. Beemer, Roger R. Parsons, Loren L. Rueter, Paul A. Seuferer, and LaDell R. Swiden. 15 Feb 75, 184p Rept no. R-0275006 AFCRL-TR-75-0120
Contract F19628-73-C-0076

Descriptors: *Airships, *Airship envelopes, Balloons, Tethering, Gondolas, Fuel cells, Propellers(Aerial), Automatic pilots, Computer programs.
Identifiers: POBAL-S airships.

An engineering analysis and development effort has been executed to design a superpressure airship, POBAL-S, capable of station keeping at an altitude of 21 kilometers for a duration of 7 days while supporting a payload weighing 890 newtons and requiring 500 watts of electrical power. A detailed parametric trade-off between various power sources and other design choices was performed. The computer program used to accomplish this analysis is described and many results are presented. Th system concept which resulted was a fuel cell powered, propeller driven airship controlled by an onboard autopilot with basic commands telemetered from a ground control station. Design of the balloon, power train, gimbaled propeller assembly, and electronic/electrical systems is presented. Flight operations for launch and recovery are discussed.

AD-A012 371/1GA PC$4.75/MF$2.25
Lockheed-California Co Burbank
Commercial Aircraft Noise Definition - L1011 Tristar. Volume I.
Final rept. Jun 73-Sep 74,
Nathan Shapiro. Sep 74, 85p Rept no. LR-26075-Vol-1 FAA-EQ-73-6-Vol-1
Contract DOT-FA73WA-3300
See also Volume 2, AD-A012 372.

Descriptors: *Commercial aircraft, *Jet transport planes, *Jet plane noise, Aircraft noise, Jet engine noise, Noise pollution, Acoustic signatures, Acoustic attenuation, Takeoff, Aircraft landings, Computer programming, Aerodynamic noise.
Identifiers: L-1011 aircraft, *Noise levels, DOT/4DZ/AA, DOT/5B.

Calculation procedures to describe airplane noise during takeoff and approach have been programmed for batch operation on a large digital computer. Three routines are included. The first normalizes far-field noise spectra to reference conditions and then determines spectra at various distances from the airplane, for airport elevations between sea level and 6000 feet and ambient temperatures between 30F and 100F. Overall sound pressure levels, A-weighted noise levels, perceived noise levels, and effective perceived noise levels are calculated. The second routine uses aerodynamic and engine thrust data to produce takeoff and approach flight path description. The basic takeoff is at equivalent airspeed, with thrust reduction or acceleration option after gear-up. The approach is along any constant glide slope between 3 and 6 degrees at constant airspeed, with a two-segment option. The last routine combines noise propagation and flight path information to produce constant noise contour footprints. The program has been exercised on Lockheed L-1011-1 Tristar/Rolls-Royce RB.211-22 data, providing results in EPNdB and dBA.

AD-A012 372/9GA PC$9.25/MF$2.25
Lockheed-California Co Burbank
Commercial Aircraft Noise Definition - L-1011 Tristar. Volume II-L-1011-1 Data.
Final rept. Jun 73-Sep 74,
Nathan Shapiro. Sep 74, 302p Rept no. LR-26075-Vol-2 FAA-EQ-73-6-Vol-2
Contract DOT-FA73WA-3300
See also Volume 1, AD-A012 371 and Volume 3, AD-A012 373.

Descriptors: *Commercial aircraft, *Jet transport planes, *Jet plane noise, Aircraft noise, Jet engine noise, Aerodynamic noise, Noise pollution, Acoustic signatures, Acoustic attenuation, Takeoff, Aircraft landings, Statistical data.
Identifiers: L-1011 aircraft, *Noise levels, DOT/4DZ/DA, DOT/5B.

Calculation procedures to describe airplane noise during takeoff and approach have been programmed for batch operation on a large digital computer. Three routines are included. The first normalizes far-field noise spectra to reference conditions and then determines spectra at various distances from the airplane, for airport elevations between sea level and 6000 feet and ambient temperatures between 30F and 100F. Overall sound pressure levels, A-weighted noise levels, perceived noise levels, and effective perceived noise levels are calculated. The second routine uses aerodynamic and engine thrust data to produce takeoff and approach flight path description. Volume 2 includes L-1011-1 noise propagation and airplane performance and samples of contours.

AD-A012 373/7GA PC$5.25/MF$2.25
Lockheed-California Co Burbank
Commercial Aircraft Noise Definition - L-1011 Tristar. Volume III - Program User's Manual.
Final rept. Jun 73-Sep 74,
Sep 74, 105p Rept no. LR-26075-Vol-3 FAA-EQ-73-6-Vol-3
Contract DOT-FA73WA-3300
See also Volume 2, AD-A012 372 and Volume 4, AD-A012 374.

Descriptors: *Commercial aircraft, *Jet transport planes, *Jet plane noise, Aircraft noise, Jet engine noise, Aerodynamic noise, Noise pollution, Acoustic signatures, Acoustic attenuation, Takeoff, Aircraft landings, Computer programming, User needs.
Identifiers: L-1011 aircraft, *Noise levels, DOT/4DZ/DA, DOT/5B.

Calculation procedures to describe airplane noise during takeoff and approach have been programmed for batch operation on a large digital computer. Three routines are included. The first normalizes far-field noise spectra to reference conditions and then determines spectra at various distances from the airplane, for airport elevations between sea levels and 6000 feet and ambient temperatures between 30F and 100F. Overall sound pressure levels, A-weighted noise levels, perceived noise levels, and effective perceived noise levels are calculated. The second routine uses aerodynamic and engine thrust data to produce takeoff and approach flight path description. Volume 3 presents the logic behind the calculations and outlines the computational procedures.

AD-A012 374/5GA PC$5.75/MF$2.25
Lockheed-California Co Burbank
Commercial Aircraft Noise Definition - L-1011 Tristar. Volume IV-Program Design Specification.
Final rept. Jun 73-Sep 74,
Nathan Shapiro. Sep 74, 126p Rept no. LR-26075-Vol-4 FAA-EQ-73-6-Vol-4
Contract DOT-FA73WA-3300
See also Volume 3, AD-A012 373 and Volume 5, AD-A012 375.

Descriptors: *Commercial aircraft, *Jet transport planes, *Jet plane noise, Aircraft noise, Jet engine noise, Aerodynamic noise, Noise pollution, Acoustic signatures, Acoustic attenuation, Takeoff, Aircraft landings, Computer programming.
Identifiers: L-1011 aircraft, *Noise levels, DOT/4DZ/DA, DOT/5B.

Calculation procedures to describe airplane noise during takeoff and approach have been programmed for batch operation on a large digital computer. Three routines are included. The first normalizes far-field noise spectra to reference conditions and then determines spectra at various distances from the airplane, for airport elevations between sea level and 6000 feet and ambient temperatures between 30F and 100F. Overall sound pressure levels, A-weighted noise levels, perceived noise levels, and effective perceived noise levels are calculated. The second routine uses aerodynamic and engine thrust data to produce takeoff and approach flight path description. Volume 4 describes the computer program and gives instructions for its operation.

AD-A012 375/2GA PC$10.00/MF$2.25
Lockheed-California Co Burbank
Commercial Aircraft Noise Definition - L-1011 Tristar. Volume V-Computer Programmer's Manual.
Final rept. Jun 73-Sep 74,
Nathan Shapiro. Sep 74, 370p Rept no. LR-26075-Vol-5 FAA-EQ-73-6-Vol-5
Contract DOT-FA73WA-3300
See also Volume 4, AD-A012 374.

Descriptors: *Commercial aircraft, *Jet transport planes, *Jet plane noise, Aircraft noise, Jet engine noise, Aerodynamic noise, Noise pollution, Acoustic signatures, Acoustic attenuation, Takeoff, Aircraft landings, Computer programs, User needs.
Identifiers: L-1011 aircraft, *Noise levels, DOT/4DZ/DA, DOT/5B.

Calculation procedures to describe airplane noise during takeoff and approach have been programmed for batch operation on a large digital computer. Three routines are included. The first normalizes far-field noise spectra to reference conditions and then determines spectra at various distances from the airplane, for airport elevations between sea level and 6000 feet and ambient temperatures between 30F and 100F. Overall sound pressure levels, A-weighted noise levels, perceived noise levels, and effective perceived noise levels are calculated. The second routine uses aerodynamic and engine thrust data to produce takeoff and approach flight path description. Volume 5 describes the computer program and give instructions for its operation.

AD-A012 384/4GA PC$4.75/MF$2.25
Boeing Commercial Airplane Co Seattle Wash
Aircraft Noise Definition.
Final rept.,
B. G. Williams, and R. Yates. Dec 73, 78p Rept no. D6-41302 FAA-EQ-73-7-1
Contract DOT-FA73WA-3254

Descriptors: *Aircraft noise, *Acoustic measurement, Noise reduction, Data acquisition, Data reduction, Takeoff, Approach, Climbing.
Identifiers: DOT/5C, DOT/4DZ/DA, Boeing aircraft.

Acoustic data acquisition and reduction systems are discussed together with analytical procedures used to derive noise characteristics of a series of Boeing aircraft types. Noise data are presented in EPNdB and dB(A) units, from takeoff to low approach thrust and for aircraft altitudes from 200 to 12,000 feet. Areas of possible data deficiency are identified and 90% confidence limits established where possible. A flight test program is proposed with the objectives of improving data accuracy and establishing confidence limits over a wide range of operating conditions.

AD-A012 385/1GA PC$4.25/MF$2.25
Boeing Computer Services Inc Seattle Wash
Boeing Airplane/Noise Performance Computer Program. User's Manual.
Final rept.,
K. Bhatia, M. A. Jaeger, B. G. Williams, and R. Yates. Dec 73, 61p Rept no. BCS-G0422 FAA-EQ-73-7-6
Contract DOT-FA73WA-3254

Descriptors: *Aircraft noise, *Computer programming, Manuals, Takeoff, Approach, Noise reduction, Noise pollution.
Identifiers: Boeing aircraft, DOT/5C, DOT/4DZ/DA.

The document provides program usage for the Boeing Airplane Noise/Performance Computer Program. The program calculates takeoff and approach profiles, including noise-abatement procedures, with output data for distance, height, speed, thrust, rate of climb, gradient, deck angle, engine pressure ratio, rotor speed, and noise under the flightpath in units of EPNdB and dB(A). Several cases are included in a sample run of the program to illustrate the input requirements and output capabilities.

AD-A012 386/9GA PC$6.25/MF$2.25
Texas A and M Univ College Station Flight Mechanics Lab
Development of Stall Deterrent Concepts for General Aviation Aircraft.
Final rept. Jun 74-Feb 75,
H. L. Chevalier, C. R. Gallaway, and J. R. Brown. Feb 75, 153p FAA-RD-75-52
Contract DOT-FA74WA-3516

Descriptors: *Aircraft, *Stalling, *Aerodynamic control surfaces, Horizontal stabilizers, Tail assemblies, Stabilization systems, Trim tabs, Spoilers, Feasibility studies.
Identifiers: *General aviation aircraft, DOT/4DZ/DA, DOT/5A.

An analytical study was conducted to determine the feasibility of five approaches to develop an airplane stall deterrent device. For three approaches the static longitudinal stability and control characteristics of a typical light single-engine and twin-engine airplane were obtained and modified with each stall deterrent device. These characteristics were compared to those of an ideal stall deterrent airplane. The five approaches to stall deterrence were the use of a segmented elevator, an auxiliary horizontal tail, a trim tab on the horizontal tail surface, an auxiliary surface to deploy a spoiler on the horizontal tail, and changes in airplane design.

AD-A012 411/5GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Fuel Cell Pressure Loading During Hydraulic Ram.
Master's thesis,
John W. Patterson. Jun 75, 61p

Descriptors: *Aircraft, *Fuel tanks, *Vulnerability, Projectiles, Penetration, Shock(Mechanics), Drag, Pressure, Computer programs, Theses.
Identifiers: *Hydraulic ram.

Hydraulic ram is the phenomenon associated with the damage caused by high speed projectile impacts with fuel tanks. It is divided into five phases, entry, shock, drag, cavity and exit. The entry, shock and drag phases were of concern in this study. An analytical solution for the pressures developed in the shock phase was formulated based on bullet impact parameters. Pressures developed in the drag phase were experimentally correlated with theoretical predictions. These pressures were proven to be dependent on front wall wave reflections.

N75-23532/5GA PC$3.25/MF$2.25
Virginia Univ., Charlottesville. Dept. of Engineering Science and Systems.
Passenger Demographics and Subjective Response to Commuter Aircraft in the Northeast.
D. Noskowitz, and I. D. Jacobson. Dec 74, 23p NASA-CR-142876, MR-403219
Contract NGR-47-005-181

Descriptors: *Commercial aircraft, *Passengers, Beechcraft aircraft, Canada, Comfort, De havilland aircraft, S-61 helicopter.

For abstract, see STAR 1315

N75-23533/3GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
High-Capacity Transport Planes as Modern Air Freight Systems.
H. M. Weiss. Jun 75, 15p NASA-TT-F-16396
Contract NASW-2483
Tran-Transl. Into English from Forden und Heben. (West Germany), V. 22, No. 2, 1972 p 97-100.

Descriptors: *Air cargo, *Cranes, *Elevators (Lifts), *Mines (Excavations), *Transport aircraft, Air traffic, C-5 aircraft, Conveyors, International trade, Materials handling, Switzerland.

For abstract, see STAR 1315

N75-23534/1GA PC$6.25/MF$2.25
Douglas Aircraft Co., Inc., Santa Monica, Calif.
Analysis of Operational Requirements for Medium Density Air Transportation. Volume 1: Summary.
Mar 75, 166p NASA-CR-137603, MDC-J4484-VOL-1
Contract NAS2-8135

Descriptors: *Air traffic, *Air transportation, Aircraft design, Aircraft models, Aircraft performance, Market research, Tradeoffs, Value engineering.

For abstract, see STAR 1315

N75-23555/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
The Effect of Chine Tires on Nose Gear Water-Spray Characteristics of a Twin Engine Airplane.
T. J. Yager, S. M. Stubbs, and J. L. Mccarty. May 75, 26p NASA-TM-X-72695

Descriptors: *Aircraft tires, *Airfield surface movements, *Landing gear, *Nose wheels, Aircraft hazards, Operations research, Runway conditions, Water.

For abstract, see STAR 1315

N75-23556/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Study of Helicopter Interior Noise Reduction.
J. T. Howlett, and S. A. Clevenson. May 75, 8p NASA-TM-X-72655, L-10076
Conf-Presented at the 31ST Ann. Natl. Forum of the Amer. Helicopter Soc., May 1975.

Descriptors: *Aircraft compartments, *Helicopters, *Noise reduction, Aircraft noise, Vibration.

For abstract, see STAR 1315

N75-23557/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Correlation of Low Speed Wind Tunnel and Flight Test Data for V/STOL Aircraft.
W. L. Cook, and D. H. Hickey. Apr 75, 13p NASA-TM-X-62423, A-5998

Descriptors: *Flight tests, *V/stol aircraft, *Wind tunnel tests, Accuracy, Aerodynamic characteristics, Aircraft noise, Data correlation, Performance tests, Xv-5 aircraft.

For abstract, see STAR 1315

N75-23558/0GA PC$7.00/MF$2.25
Rockwell International Corp., Los Angeles, Calif.
Design and Analysis of a Supersonic Penetration/Maneuvering Fighter.
R. D. Child. Apr 75, 182p NASA-CR-132633
Contract NAS1-13496

Descriptors: *Aircraft design, *Fighter aircraft, *Supersonic flight, Aerodynamic characteristics, Aircraft maneuvers, Missiles, Weapon systems.

For abstract, see STAR 1315

N75-23559/8GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.

Effect of Canard Position and Wing Leading-Edge Flap Deflection on Wing Buffet at Transonic Speeds.
B. B. Gloss, W. P. Henderson, and J. K. Huffman. 16 Apr 74, 92p NASA-TM-X-72681

Descriptors: *Canard configurations, *Leading edge slats, *Transonic speed, Aerodynamic coefficients, Buffeting, Deflection, Maneuverability, Wind tunnel tests, Wing flaps.

For abstract, see STAR 1315

N75-23567/1GA PC$3.75/MF$2.25
Texas A&M Univ., College Station. Texas Engineering Experiment Station.
Improvement of Propeller Static Thrust Estimation.
Final Report.
J. Brusse, and C. F. Kettleborough. May 75, 28p NASA-CR-132680
Contract NGR-44-001-011

Descriptors: *Propeller drive, *Propeller efficiency, *Static thrust, Numerical analysis, V/stol aircraft.

For abstract, see STAR 1315

N75-23568/9GA PC$7.50/MF$2.25
Lockheed-California Co., Burbank.
Conceptual Design Study of Advanced Acoustic Composite Nacelle.
Final Report, Jun. 1974 - Feb. 1975.
R. G. Goodall, and G. W. Painter. May 75, 241p NASA-CR-132649, LR-27113
Contract NAS1-13233

Descriptors: *Nacelles, *Noise reduction, Aircraft design, Composite materials, Cost reduction, Nozzle flow, Rocket linings, Weight reduction.

For abstract, see STAR 1315

N75-23885/7GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Subscale, Hydrogen-Burning, Airframe-Integrated-Scramjet: Experimental and Theoretical Evaluation of a Water Cooled Strut Airframe-Integrated-Scramjet: Experimental Leading Edge.
S. Z. Pinckney, R. W. Guy, H. L. Beach, and R. C. Rogers. May 75, 43p NASA-TM-X-72682

Descriptors: *Airframes, *Leading edges, *Supersonic combustion ramjet engines, Finite difference theory, Fluid mechanics, Liquid cooling, Liquid hydrogen, Scale models, Struts, Supersonic heat transfer.

For abstract, see STAR 1315

PAT-APPL-566 163/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Tethered Balloon Mooring Means.
Patent Application,
E. L. Crosby. Filed 8 Apr 75, 13p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Balloons, *Tethering, Mooring, Guy wires, Cable assemblies, Patents.
Identifiers: *Patent applications.

The patent application relates to method and means for mooring a tethered balloon and, more particularly, the invention is concerned with providing a four rope equilateral square pyramid arrangement attached to the nose of a balloon for mooring the balloon without the necessity of a mooring mast and accompanying massive nose structure.

1D. Aircraft Flight Control and Instrumentation

AD-A012 387/7GA PC$4.25/MF$2.25
Ohio State Univ Research Foundation Columbus
Development of Stall Deterrent Device for Small Airplanes.
Final rept. 26 Jun 74-25 Jan 75,
Richard D. Gilson, and Robert W. Fenton. Jun 75, 66p Rept no. OSURF-3962-FR FAA-RD-75-53
Contract DOT-FA74WA-3515

Descriptors: *Aircraft, *Flight instruments, *Stall warning indicators, Display systems, Angle of attack, Stalling, Man machine systems, Aviation safety.
Identifiers: *General aviation aircraft, *Tactual devices, DOT/4DZ/DA, DOT/1Z/IC.

A kinesthetic-tactual display may be effectively used as a control aid, per previous flight tests. Angle-of-attack (AOA) information would be continuously presented to a pilot, via this display, during critical operational phases -- approaches to landing, takeoff and departures, and accelerated maneuvers -- where stalls are probable. He would then have a continuous indication of aerodynamic state, and thus perform the necessary control before a stall condition was reached

N75-23606/7GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
A Formal Structure for Advanced Automatic Flight-Control Systems.
G. Meyer, and L. Cicolani. May 75, 39p NASA-TN-D-7940, A-5710

Descriptors: *Aircraft design, *Automatic flight control, *Short takeoff aircraft, Air traffic control, Automatic pilots, Control equipment, Jet flaps, Trajectory analysis.

For abstract, see STAR 1315

1E. Air Facilities

AD-A012 003/0GA PC$5.25/MF$2.25
Air Force Weapons Lab Kirtland AFB N Mex
The Air Force Weapons Laboratory Skid Resistance Research Program, 1969-1974.
Final rept. 1 Jul 69-30 Jun 74,
George D. Ballentine. May 75, 112p Rept no. AFWL-TR-74-181

Descriptors: *Pavements, *Runways, *Skidding, Military facilities, Friction, Surfaces, Landing fields, Performance(Engineering), Test methods, Regression analysis, Air Force research, Reviews.
Identifiers: Hydroplaning, Skid resistance.

A summary is presented of research done on airfield pavement skid resistance at the Air Force Weapons Laboratory during the years 1969-1974. Included are a description of the standard skid resistance evaluation procedures developed by the Weapons Laboratory, a summary of information gained from study of skid-resistance data from some 14 airfields.

AD-A012 068/3GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Engineer Design Tests of Dow Truss Web Landing Mats with Waterproofable Connectors and Seals.
Final rept.,
Gordon L. Carr. May 75, 84p Rept no. AEWES-Misc-Paper-S-75-13

Descriptors: *Landing mats, Traffic, Loads(Forces), Waterproofing, Seals(Stoppers), Connectors, Pressure, Jet transport planes, Military facilities, Texas, Effectiveness, Rainfall, Performance(Engineering), Wear resistance, Failure(Mechanics).
Identifiers: Design, Pavement bases, XM-19 mats, XM-18 mats, C-5 aircraft, C-5A aircraft.

Dow truss web waterproofable landing mat was tested without seals under a 50,000-lb single-wheel load (SWL) with 250-psi tire inflation pressure on a four-CBR subgrade to determine its life in coverages. The panels were placed at a rate of 822 sq ft per man-hour. The full and half panels sustained 1440 coverages of the above loading on a four-CBR subgrade. A limited number of mats with seals were tested to evaluate the effectiveness of the seal using a C-5A loading (26,600-lb SWL with 100-psi tire inflation pressure) on a 12-CBR subgrade during a two-month period while natural and simulated rainfall of over 10 in. was recorded.

AD-A012 111/1GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Field Test of a Foamed Polystyrene Board Expedient Road Test Section in Central Alaska.
Technical rept.,
North Smith. Jun 75, 25p Rept no. CRREL-TR-263

Descriptors: *Landing mats, *Insulation, *Runways, *Road tests, Polystyrene, Foam, Loads(Forces), Surfaces, Construction, Structural properties, Performance(Engineering), Freezing, Melting, Summer, Failure(Mechanics), Temperature gradients, Alaska.
Identifiers: XM-18 mats, Fairbanks(Alaska), *Insulation boards, Settlement(Structural), Expedient roads, Frozen soils.

Foamed polystyrene in board stock form was tested as an expedient surface insulation with XM-18 airfield landing mats as a trafficking surface. The insulation was placed on a frozen subgrade in two layers, making a total thickness of four in. The test section was constructed in May 1971 near Fairbanks, Alaska, at the USA CRREL Farmers Loop Road Facility. The section was trafficked with a load cart which applied a total wheel load of 26.2 kips on a C-130 main landing gear wheel having a tire inflation pressure of 80 psi. Four hundred passes of the load cart were made on the test section; the final level surveys showed a minimum of settlement and structural distress to the insulation boards. The maximum depth of thaw beneath the insulation did not exceed 20 in. during each of the summers of 1971 and 1972. This method of expedient road construction would provide satisfactory service throughout a summer thaw season and probably longer without deleterious effects on the subgrade and the adjacent environment.

AD-A012 115/2GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Foamed-In-Place Polyurethane Insulated Traffic Test Sections for Expedient Roads.
Technical rept.,
N. Smith, R. L. Berg, and L. Muller. Jun 75, 23p Rept no. CRREL-TR-262

Descriptors: *Landing mats, *Insulation, *Runways, Polyurethane resins, Foam, Traffic, Loads(Forces), Sprays, Thickness, Melting, Seasonal variations, Failure(Mechanics), Temperature gradients, Construction, Alaska.
Identifiers: T-15 mats, Settlement(Structural), Frozen soils, Fairbanks(Alaska).

Foamed-in-place polyurethane was tested as an expedient road surface insulation and load

distributing structural layer with T15 aluminum airfield landing mat as a trafficking surface. The insulation was sprayed on leveling courses of either woodchips or gravel with thicknesses of about 15 cm. Various thicknesses of insulation with two densities were used singly and in combinations of layers. Total insulation thicknesses ranged from 2.5 to 28 cm. The test sections were constructed in April 1970 and trafficked during the thaw seasons of 1970 and 1971 with a military dump truck loaded with gravel. The total test vehicle weight was 12,270 kg with a maximum single wheel load of 2,415 kg. The test sections withstood over 1,000 passes of the test vehicle without suffering complete failure. Observations by surface level measurements showed settlements of 0.0 to 14.0 cm. Sugrade temperature observations by thermocouples showed thaw depths in the subgrade from 24.0 to 99 cm. This method of expedient road construction would provide satisfactory service throughout two thaw seasons and possibly longer without deleterious effects to the subgrade and adjacent environment.

AD-A012 142/6GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Landing Mat over Membrane-Enveloped Soil Layers.
Final rept.,
Cecil D. Burns, and George L. Regan. Jun 75, 86p Rept no. AEWES-Misc-Paper-S-75-14

Descriptors: *Landing mats, *Foundations(Structures), *Membranes, Test methods, Loads(Forces), Traffic, Landing fields, Thickness, Encapsulation, Jet transport planes, Failure(Mechanics), Effectiveness, Construction, Deformation.
Identifiers: XM-18 mats, Pavement bases, C-141 aircraft, Design, Membrane encased soil layers, XM-19 mats.

The study was conducted to evaluate the effectiveness of a membrane-encased soil layer (MESL) base course under medium-duty landing mat when subjected to C-141 aircraft loading. A special test section consisting of five test items was constructed and trafficked. Test item 1 was considered a control item and was designed to support about 1000 coverages of the C-141 aircraft loading. The design was based on current criteria for airfields surfaced with medium-duty mats. Items 2-5 were designed for MESL base courses of reduced thicknesses. The test included both XM18 and XM19 mats. The test section was subjected to traffic with one main gear of a C-141 aircraft assembly (twin-tandem assembly) loaded to 146,000 lb.

AD-A012 144/2GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Evaluation and Selection of Experimental Membranes for Use as Medium-Duty Surfacing.
Final rept.,
Albert J. Bush, III. Jun 75, 87p Rept no. AEWES-TR-S-75-8
See also report dated Mar 70, AD-756 361.

Descriptors: *Helicopters, *Landing fields, *Membranes, Forward areas, Waterproofing, Dust control, Skidding, Nylon, Neoprene, Army aircraft.
Identifiers: H-1 aircraft, UH-1 aircraft, H-54 aircraft, CH-54A aircraft, CH-54B aircraft.

This study evaluates experimental prefabricated membranes for use as expedient dustrpoofing and waterproofing mediums for current Army helicopters. Laboratory and skid tests were conducted on nine membrane candidates at the Waterways Experiment Station (WES) to select a medium-duty membrane that meets the Department of the Army approved Qualitative Materiel Requirement (QMR) for Prefabricated Airfield Surfacings. Skid tests determined the most critical helicopter with respect to locked-wheel braking or skid resistance.

3. ASTRONOMY AND ASTROPHYSICS

3B. Astrophysics

COM-75-50385/4GA Not available NTIS
National Bureau of Standards, Washington, D.C.
One- and Multi-Component Models of the Upper Atmosphere Based on Molecular Spectra IV: Non-LTE Treatment of the CN Violet System.
Final rept.,
George H. Mount, and Jeffrey L. Linsky. Mar 75, 17p
Grant NGL-06-003-057
Pub. in Solar Physics, v41 n1 p17-33 Mar 75.

Descriptors: *Photosphere, *Molecular spectra, Carbon, Isotope availability, Ultraviolet spectra.
Identifiers: *Cyanogen radical, Reprints.

Non-LTE synthetic spectra derived from a detailed analysis of the formation of the CN(0,0) 3883 A spectrum are compared with centerlimb photoelectric spectra taken at Kitt Peak National Observatory. Significant non-LTE effects are found and the Kurucz, Altrock-Cannon, Mount-Linsky II, and HSRA models are compared. Solar carbon abundances are derived for the models. The authors specify the regions of formation for the CN(0,0) 3883.35 A bandhead at disc center and limb.

N75-23924/4GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Si(Li) X-Ray Astronomical Spectroscopy.
S. S. Holt. May 75, 28p NASA-TM-X-70894, X-661-75-115
Subm-Submitted for Publication. Conf-Presented at the Symp. On the Techniques of Solar and Cosmic X-Ray Spectroscopy, May 1975.

Descriptors: *Heao, *X ray astronomy, *X ray spectroscopy, Germanium, Lithium, Performance prediction, Semiconductors (Materials), Silicon, Spectrum analysis.

For abstract, see STAR 1315

N75-23927/7GA PC$3.25/MF$2.25
Washington Univ., St. Louis, Mo.
Astronomy at sub-Millimeter Wavelengths.
Final Report.
M. W. Friedlander. 4 Jun 75, 6p NASA-CR-142814
Contract NGR-26-008-069

Descriptors: *Astronomy, *Gondolas, *Spaceborne telescopes, *Submillimeter waves, Celestial mechanics, Flight tests, Radio control, Wavelengths.

For abstract, see STAR 1315

N75-23986/3GA PC$3.25/MF$2.25
Battelle Columbus Labs., Ohio.
Fabrication of Experimental Three-Meter Space Telescope Primary and Secondary Mirror Support Structure.
Final Report, Jul. 1971 - Feb. 1974.
H. W. Mishler. 31 Jul 74, 15p NASA-CR-143796
Contract NAS5-11499

Descriptors: *Mirrors, *Prototypes, *Structural design, *Telescopes, Forming techniques, Gas tungsten arc welding, Titanium alloys.

For abstract, see STAR 1315

N75-24555/5GA PC$8.75/MF$2.25
European Space Research Organization, Paris (France).
H2 Regions and the Galactic Centre.
A. F. M. Moorwood. Nov 74, 292p ESRO-SP-105 Conf-Proc. Of the 8TH Eslab Symp., Frascati, Italy, 4-7 Jun. 1974.

Descriptors: *Conferences, *Galactic nuclei, *Galactic structure, *Hydrogen clouds, *Infrared astronomy, *Radio astronomy, Balloon-borne instruments, Nebulae.

For abstract, see STAR 1315

N75-24593/6GA PC$3.75/MF$2.25
Michigan Univ., Ann Arbor.
Data User'S Notes of the Radio Astronomy Experiment Aboard the OGO-V Spacecraft.
F. T. Haddock, and S. L. Breckenridge. 20 Apr 70, 46p NASA-CR-143696, UM/RAO-70-3
Contract NAS5-9099

Descriptors: *Ogo-5, *Radio astronomy, *Spaceborne astronomy, Computer components, Data reduction, Instrument packages, Preflight operations, Radiometers, Random access memory.

For abstract, see STAR 1315

N75-24594/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
The Rocket Ultraviolet Spectrum of the Planetary Nebula Ngc 7027.
R. C. Bohlin, P. A. Marionni, and T. P. Stecher. May 75, 22p NASA-TM-X-70892, X-672-75-113
Subm-Submitted for Publication.

Descriptors: *Planetary nebulae, *Rocket-borne instruments, *Ultraviolet spectra, Line spectra, Spectrum analysis.

For abstract, see STAR 1315

N75-24595/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Spectral Variability of Cyg X-3.
P. J. Serlemitsos, E. A. Boldt, S. S. Holt, R. E. Rothschild, and J. L. R. Saba. Apr 75, 19p NASA-TM-X-70891, X-661-75-98

Descriptors: *Cygnus constellation, *Stellar spectra, *X ray sources, Black body radiation, Payloads, Stellar luminosity, X ray spectra.

For abstract, see STAR 1315

N75-24596/9GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Temporal X-Ray Astronomy with a Pinhole Camera.
S. S. Holt. May 75, 38p NASA-TM-X-70893, X-661-75-114
Subm-Submitted for Publication. Conf-Presented at the Cospar Symp. On Fast Transients in X- and gamma-Rays; Varna, Bulgaria; May 1975.

Descriptors: *All sky photography, *Ariel satellites, *Cygnus constellation, *Scorpius constellation, *X ray astronomy, Light curve, Signal to noise ratios, X ray sources.

For abstract, see STAR 1315

N75-24597/7GA PC$3.25/MF$2.25
Arizona Univ., Tucson. Lunar and Planetary Lab.
Infrared Spectroscopy of Comet Kohoutek.
Final Report.
U. Fink. 15 May 75, 14p NASA-CR-142809
Contract NGR-03-002-392

Descriptors: *Comets, *Frost, *Infrared spectroscopy, Absorption spectra, Ammonia, Carbon dioxide, Face centered cubic lattices, Hydrogen sulfide, Ice formation.

For abstract, see STAR 1315

N75-24598/5GA PC$3.75/MF$2.25
Texas Univ., Austin. Dept. of Astronomy.
Copernicus Observations of Betelgeuse and Antares.
A. P. Bernat, and D. L. Lambert. 1975, 32p
NASA-CR-142815
Grant NSG-5005

Descriptors: *Oao 3, *Satellite observation, *Supergiant stars, Emission spectra, Line spectra, Stellar envelopes.

For abstract, see STAR 1315

N75-24599/3GA PC$10.50/MF$2.25
Smithsonian Astrophysical Observatory, Cambridge, Mass.
A Table of Semiempirical Gf Values. Part 1: Wavelengths: 5.2682 NM to 272.3380 NM.
R. L. Kurucz, and E. Peytremann. 14 Feb 75, 415p NASA-CR-142879, SAO-SPECIAL-REPT-362-PT-
Grant NSG-7054
Seri-3.

Descriptors: *Atmospheric models, *Line spectra, *Solar spectra, *Stellar spectra, Astronomical spectroscopy, Tables (Data), Wave functions, Wavelengths.

For abstract, see STAR 1315

N75-24600/9GA PC$10.50/MF$2.25
Smithsonian Astrophysical Observatory, Cambridge, Mass.
A Table of Semiempirical Gf Values. Part 2: Wavelengths: 272.3395 NM to 599.3892 NM.
R. L. Kurucz, and E. Peytremann. 14 Feb 75, 403p NASA-CR-142880, SAO-SPECIAL-REPT-362-PT-
Grant NSG-7054
Seri-3.

Descriptors: *Atmospheric models, *Line spectra, *Solar spectra, *Stellar spectra, Astronomical spectroscopy, Tables (Data), Wave functions, Wavelengths.

For abstract, see STAR 1315

N75-24601/7GA PC$10.50/MF$2.25
Smithsonian Astrophysical Observatory, Cambridge, Mass.
A Table of Semiempirical Gf Values. Part 3: Wavelengths: 599.4004 NM to 9997.2746 NM.
R. L. Kurucz, and E. Peytremann. 14 Feb 75, 422p NASA-CR-142881, SAO-SPECIAL-REPT-362-PT-
Grant NSG-7054
Seri-3.

Descriptors: *Atmospheric models, *Line spectra, *Solar spectra, *Stellar spectra, Astronomical spectroscopy, Tables (Data), Wave functions, Wavelengths.

For abstract, see STAR 1315

N75-24605/8GA PC$3.75/MF$2.25
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Plasma in the Jovian Magnetosphere.
C. K. Goertz. Apr 75, 48p NASA-CR-142761, U-OF-IOWA-75-16
Contracts NAS5-5603, NAS2-6563

Descriptors: *Jupiter (Planet), *Magnetospheric ion density, Centrifugal force, Ion recombination, Magnetohydrodynamic stability, Magnetosphere, Planetary rotation, Plasma density.

For abstract, see STAR 1315

N75-24606/6GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Measurements of Ion Fluxes Using Riep-2801 M Instrument on Board MARS-4 and MARS-5 Automatic Interplanetary Stations.
O. L. Vaysberg, A. V. Bogdanov, V. N. Smirnov, and S. A. Romanov. May 75, 4p NASA-TT-F-16352
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 129-130.

Descriptors: *Mars probes, *Solar flux, *U.s.s.r. space program, Boundary layers, Shock waves, Solar wind.

For abstract, see STAR 1315

N75-24607/4GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Interplanetary Charged Particle Models (1974).
NASA Space Vehicle Design Criteria (Environment).
N. Divine. Mar 75, 47p NASA-SP-8118

Descriptors: *Astronomical models, *Charged particles, *Interplanetary medium, *Spacecraft components, Cosmic rays, Radiation damage, Solar cells, Solar protons, Solar wind.

For abstract, see STAR 1315

N75-24608/2GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Gravity Fields of the Solar System.
NASA Space Vehicle Design Criteria (Environment).
A. Zendell, R. D. Brown, and S. Vincent. Apr 75, 79p NASA-SP-8117

Descriptors: *Gravitational fields, *Planetary gravitation, Astronomical models, Ellipsoids, Harmonic analysis, Oblate spheroids, Point sources, Solar system.

For abstract, see STAR 1315

N75-24609/0GA PC$3.75/MF$2.25
Royal Observatory, Edinburgh (Scotland).
Galactic Structure at L 2 Equals 40 Deg.
W. A. Sherwood. 1974, 37p SBN-902553-11-9
Subm-Sponosred in Part by Sci. Res. Council and Deut. Forschungsges.

Descriptors: *Galactic structure, *O stars, *Star distribution, *Stellar luminosity, Astronomical photography, Cosmic dust, Frequency distribution, Spectrum analysis, Stellar occultation, Stellar spectrophotometry.

For abstract, see STAR 1315

N75-24611/6GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Investigation of Solar Plasma Near MARS and on Earth-MARS Path by Means of a Charged-Particle Trap Aboard Soviet Spacecraft, 1971 - 1973. Part 3: Characteristics of Plasma Ion and Electron Components in the Antisolar Part of Near-Martian Space Measured by MARS-5.
K. I. Gringauz, V. V. Berzrukikh, M. I. Verigin, and A. P. Remizov. May 75, 10p NASA-TT-F-16351
Contract NASW-2481
Tran-Transl. Into English from Kosmich. Issled. Akad. Nauk Sssr (Moscow), V. 13, No. 1, Jan.-Feb. 1975 p 123-128.

Descriptors: *Atomic structure, *Mars (Planet), *Mars probes, *Solar wind, Charged particles, Interplanetary magnetic fields, Ion traps (Instrumentation), Plasma layers, Shock waves, U.s.s.r..

For abstract, see STAR 1315

N75-24612/4GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Measurement of Intensity and Spectral Characteristics of Radiation in the Lyman-alpha Line in the Upper Martian Atmosphere.
Z. L. Berto, Z. Blamon, C. I. Babichenko, N. N. Dementyeva, and A. V. Dyachkov. May 75, 11p NASA-TT-F-16339
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 42-47.

Descriptors: *Lyman alpha radiation, *Mars atmosphere, *Solar radiation, *Upper atmosphere, Emission spectra, Graphs (Charts), Line spectra, Mars probes, Temperature distribution.

For abstract, see STAR 1315

N75-24613/2GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Preliminary Results of Measuring Water Vapor Content in Planetary Atmosphere from Measurements on Board the MARS-5 Automatic Interplanetary Station.
V. I. Moroz, and A. E. Nadzhip. May 75, 5p NASA-TT-F-16337
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 33-36.

Descriptors: *Mars atmosphere, *Mars probes, *Moisture content, *Water vapor, Graphs (Charts), Photometers, Spatial distribution.

For abstract, see STAR 1315

N75-24614/0GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Magnetic Field of the Planet MARS Based on MARS-3 and MARS-5 Satellite Data.
S. S. Dolginov, Y. G. Yeroshenko, and L. N. Zhuzgov. May 75, 24p NASA-TT-F-16350
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 108-122.

Descriptors: *Mariner spacecraft, *Mars (Planet), *Planetary magnetic fields, *Satellite observation, Magnetic moments, Orbital elements.

For abstract, see STAR 1315

N75-24615/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Preliminary Results of Research Conducted Aboard the Soviet MARS-4, MARS-5, MARS-6, and MARS-7 Planetary Probes.
V. I. Moroz. May 75, 10p NASA-TT-F-16333
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 3-8.

Descriptors: *Mars probes, *Space probes, *U.s.s.r. space program, Atmospheric composition, Mars (Planet), Orbital mechanics, Solar radiation.

For abstract, see STAR 1315

N75-24616/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Experimental Measuring Composition of Martian Atmosphere on Board the Descent Module of the MARS-6 Space Station.
V. G. Stomin, K. V. Grechnev, L. N. Ozerov, M. Y. Slutskiy, and V. A. Pavlenko. May 75, 9p NASA-TT-F-16335
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan. - Feb. 1975 p 16-20.

Descriptors: *Landing modules, *Mars atmosphere, *Mars 6 spacecraft, Argon, Atmospheric composition, Atmospheric entry, Gas analysis, Mass spectrometers, Radio frequencies.

For abstract, see STAR 1315

N75-24617/3GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Martian Atmosphere in the Landing Site of the Descent Module of MARS-6 (Preliminary Results).
V. S. Avduyevskiy, E. L. Akim, V. I. Aleshin, N. F. Borodin, and V. V. Kerzhanovich. May 75, 20p NASA-TT-F-16336
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 21-32.

Descriptors: *Mars (Manned reusable spacecraft), *Mars atmosphere, Mars landing, Meteorological parameters.

For abstract, see STAR 1315

N75-24618/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Ozone in the Planetary Atmosphere from Measurements on Board the MARS-7 Automatic Interplanetary Station.
V. A. Krasnopolskiy, A. A. Krysko, and V. N. Rogachev. May 75, 9p NASA-TT-F-16338
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 37-41.

Descriptors: *Mars atmosphere, *Mars probes, *Ozone, Earth atmosphere, Photometers, Rayleigh scattering, Solar radiation.

For abstract, see STAR 1315

N75-24619/9GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Polarimetric Experiment on Board MARS-5.
L. V. Ksanfomaliti, V. I. Moroz, and A. Dollfus. May 75, 10p NASA-TT-F-16348
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 92-98.

Descriptors: *Mars (Planet), *Mars probes, *Polarimetry, Instrument packages, Mars atmosphere, Mars surface, Soil science, U.s.s.r. space program.

For abstract, see STAR 1315

N75-24620/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Spectrophotometry of MARS in the 2-5 Micrometer Range on Board the MARS-5 Automatic Interplanetary Station.
V. I. Moroz, and N. A. Parfentyev. May 75, 7p NASA-TT-F-16345
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 80-83.

Descriptors: *Interplanetary spacecraft, *Mars atmosphere, *Spectrophotometry, Absorption spectra, Atmospheric moisture, Brightness, Carbon dioxide, Solar radiation, Specular reflection.

For abstract, see STAR 1315

N75-24621/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Infrared Radiometry on Board MARS-5.
L. V. Ksanfomaliti, and V. I. Moroz. May 75, 6p NASA-TT-F-16344
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 77-79.

Descriptors: *Infrared radiometers, *Mars atmosphere, *Mars probes, Brightness temperature, Mars surface, Planetary radiation, Rocket-borne instruments.

For abstract, see STAR 1315

N75-24622/3GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Results of Geologo-Morphological Analysis of Some Photographs of the Martian Surface Obtained by the MARS-4 and MARS-5 Automatic Stations.
K. P. Florenskiy, A. T. Bazilevskiy, R. O. Kuzmin, and I. M. Chernaya. May 75, 17p NASA-TT-F-16343
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 67-76.

Descriptors: *Geomorphology, *Mars probes, *Mars surface, Meteorite craters, Surface roughness, Topography.

For abstract, see STAR 1315

N75-24623/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Instrumentation and Some Results of Photographic Study on Board the MARS-4 and MARS-5 Automatic Stations.
A. S. Selivanov, M. K. Narayeva, B. A. Suvorov, I. F. Sinelnikova, and M. I. Bokhonov. May 75, 11p NASA-TT-F-16342
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan. - Feb. 1975 p 60-66.

Descriptors: *Mars probes, *Mars surface, *Photographic equipment, *Television cameras, Equipment specifications, Image filters, Photographic processing, Spectrum analysis.

For abstract, see STAR 1315

N75-24624/9GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Results of Investigating the Martian Atmosphere by Radio-Occultation Using the MARS-2, MARS-4, and MARS-6 Craft.
M. A. Kolosov, O. I. Yakovlev, G. D. Yakovleva, A. I. Yefimov, and B. P. Trusov. May 75, 10p NASA-TT-F-16341
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 54-59.

Descriptors: *Mars atmosphere, *Mars 2 spacecraft, *Mars 6 spacecraft, *Radio occultation, Frequency measurement, Ionospheric electron density, Troposphere.

For abstract, see STAR 1315

N75-24625/6GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Preliminary Results of Two-Frequency Radio-Occultation of the MARS Ionosphere by Means of MARS Planetary Probes in 1974.
M. B. Vasilyev, A. S. Vyshlov, M. A. Kolosov, N. A. Savich, and V. A. Samovol. May 75, 10p NASA-TT-F-16340
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 48-53.

Descriptors: *Ionospheric electron density, *Mars atmosphere, *Mars probes, *Radio occultation, Daytime, Graphs (Charts), Night sky, Signal processing.

For abstract, see STAR 1315

N75-24626/4GA PC$3.25/MF$2.25
Brigham Young Univ., Provo, Utah. Dept. of Physics and Astronomy.
Preliminary Model Studies of the Magnetosphere of Jupiter: Pioneer 10.
D. E. Jones, and J. G. Melville. Mar 75, 19p NASA-CR-142813
Contract NAS2-7358

Descriptors: *Jupiter atmosphere, *Magnetosphere, *Pioneer 10 space probe, Current sheets, Mathematical models, Pioneer 11 space probe, Planetary magnetic fields, Solar wind, Sunrise.

For abstract, see STAR 1315

N75-24627/2GA PC$3.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Innermost Planets of the Solar System.
1974, 4p NASA-CR-142827, ISSUE-1

Descriptors: *Mercury (Planet), *Venus (Planet), Earth-moon system, Lunar phases, Mariner venus-mercury 1973, Planetary radiation, Solar orbits.

For abstract, see STAR 1315

N75-24628/0GA PC$3.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Venus and Mercury as Planets.
1974, 4p NASA-CR-142826, ISSUE-2

Descriptors: *Mercury (Planet), *Venus (Planet), Mariner venus-mercury 1973, Planetary composition, Planetary evolution, Planetary orbits, Planetary surfaces, Solar orbits.

For abstract, see STAR 1315

N75-24630/6GA PC$3.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Venus and Mercury Encounters.
1974, 4p NASA-CR-142829, ISSUE-4

Descriptors: *Mariner space probes, *Mercury (Planet), *Space exploration, *Venus (Planet), Atmospheric temperature, Comets, Planetary atmospheres, Planetary surfaces, Satellite observation.

For abstract, see STAR 1315

N75-24631/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Jupiter: Giant of the Solar System.
1975, 4p NASA-TM-X-66827, ISSUE-1

Descriptors: *Jupiter (Planet), *Planetary mass, *Solar orbits, *Solar system, Education, Kohoutek comet, Natural satellites.

For abstract, see STAR 1315

N75-24632/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Jupiter: As a Planet.
1975, 4p NASA-TM-X-66828, ISSUE-2

Descriptors: *Extraterrestrial radio waves, *Jupiter (Planet), *Jupiter atmosphere, *Planetary mass, Education, Jupiter red spot, Life sciences, Planetary structure, Thermal radiation.

For abstract, see STAR 1315

N75-24633/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Jupiter and Planet Earth.
1975, 3p NASA-TM-X-66829, ISSUE-3

Descriptors: *Biological evolution, *Earth (Planet), *Jupiter (Planet), *Natural satellites, *Planetary evolution, Earth atmosphere, Education, Jupiter atmosphere, Pioneer 10 space probe, Radiation belts.

For abstract, see STAR 1315

N75-24634/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Mission to Jupiter.
1975, 4p NASA-TM-X-66830, ISSUE-4

Descriptors: *Jupiter (Planet), *Pioneer 10 space probe, *Pioneer 11 space probe, Interplanetary space, Radiation belts, Spacecraft design, Spacecraft instruments, Television transmission.

For abstract, see STAR 1315

N75-24635/5GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Encounter with Jupiter.
1975, 4p NASA-TM-X-66831, ISSUE-5

Descriptors: *Flight characteristics, *Jupiter (Planet), *Pioneer 10 space probe, Education, Jupiter atmosphere, Natural satellites, Planetary gravitation, Tables (Data), Television transmission.

For abstract, see STAR 1315

N75-24636/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
A New Look at Jupiter: Results at the New Frontier.
1975, 7p NASA-TM-X-66832, ISSUE-6

Descriptors: *Interplanetary space, *Jupiter (Planet), *Jupiter atmosphere, *Pioneer 10 space probe, Cosmic rays, Education, Natural satellites, Planetary magnetic fields, Radiation belts, Weather.

For abstract, see STAR 1315

N75-24637/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Pioneer 11 Encounter.
1975, 7p NASA-TM-X-66833, ISSUE-7

Descriptors: *Flight characteristics, *Jupiter (Planet), *Pioneer 11 space probe, Education, Saturn (Planet), Spacecraft instruments, Spacecraft trajectories, Tables (Data), Television transmission.

For abstract, see STAR 1315

N75-24638/9GA PC$3.25/MF$2.25
California Inst. of Tech., Pasadena. Seismological Lab.
Compaction by Impact of Unconsolidated Lunar Fines.
T. J. Ahrens. 1975, 20p NASA-CR-142877, CONTRIB-2626
Contract NGR-05-002-307

Descriptors: *Lunar rocks, *Lunar soil, *Meteorite collisions, *Meteoritic damage, Adiabatic conditions, Breccia, Hugoniot equation of state, Impact loads, Lunar craters.

For abstract, see STAR 1315

N75-24639/7GA PC$3.25/MF$2.25
New Mexico State Univ., Las Cruces. Dept. of Astronomy.
Velocity Variations of an Equatorial Plume Throughout a Jovian Year.
E. Reese, and R. Beebe. May 75, 14p NASA-CR-142894, TN-75-48
Contract NGL-32-003-001

Descriptors: *Drift rate, *Jupiter atmosphere, *Plumes, Equators, Pioneer 10 space probe, Solar heating, Solar radiation.

For abstract, see STAR 1315

N75-24640/5GA PC$5.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
New Look of the Old Moon.
K. A. Kulikov, and V. B. Gurevich. May 75, 140p NASA-TT-F-16253
NASA ORDER W-13183
Tran-Transl. Into English of the Book "Novyy Oblik Staroy Luny" Moscow, Nauka Press, 1974 p 1-152.

Descriptors: *Lunar exploration, *Moon, Apollo project, Lunar atmospheres, Lunar composition, Lunar craters, Lunokhod lunar roving vehicles, U.s.s.r. space program.

For abstract, see STAR 1315

N75-24642/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Summary of Initial Results from the Gsfc Fluxgate Magnetometer on Pioneer 11.
M. H. Acuna, and N. F. Ness. May 75, 39p NASA-TM-X-70899, X-690-75-125
Subm-Submitted for Publication. Conf-Presented at Tucson Jupiter Meeting, 18-23 May 1975.

Descriptors: *Magnetometers, *Pioneer 11 space probe, Field strength, Io, Jupiter (Planet), Magnetic dipoles, Magnetic flux, Planetary magnetic fields, Radiation belts.

For abstract, see STAR 1315

N75-24643/9GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
A Review of the Jovian Magnetosphere Based Upon Pioneer 10 and 11.
J. H. Trainor. May 75, 45p NASA-TM-X-70900, X-660-75-130
Conf-Presented at the Ann. Rev. Session 18TH Ann. Cospar Meeting, Varna, Bulgaria, 3 Jun. 1975.

Descriptors: *Jupiter atmosphere, *Magnetosphere, *Pioneer 10 space probe, *Pioneer 11 space probe, Bow waves, Current sheets, Electron energy, Magnetic fields, Magnetopause, Ring currents.

For abstract, see STAR 1315

N75-24645/4GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Some Results of Investigation of Solar Cosmic Rays on Board MARS-7 Station.
S. N. Vernov, N. V. Alekseyev, P. V. Vakulov, N. I. Vvologdin, and Y. V. Gorchakov. May 75, 8p NASA-TT-F-16353
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13,, No. 1, Jan.-Feb. 1975 p 131-135.

Descriptors: *Mars probes, *Solar cosmic rays, *Solar flares, Cerenkov counters, Proton flux density, Radiation counters.

For abstract, see STAR 1315

N75-24646/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Solar gamma-Ray Lines as Probes of Accelerated Particle Directionalities in Flares.
R. Ramaty, and C. J. Crannell. Apr 75, 13p NASA-TM-X-70890, X-660-75-96
Subm-Submitted for Publication.

Descriptors: *Gamma rays, *Line spectra, *Particle acceleration, *Solar flares, Angular distribution, Charged particles, Doppler effect, Energy distribution, Monte carlo method.

For abstract, see STAR 1315

4. ATMOSPHERIC SCIENCES

4A. Atmospheric Physics

AD-A011 683/0GA PC$3.75/MF$2.25
Epsilon Labs Inc Bedford Mass
Electric Field Rocket Program.
Final rept. 20 Jul 73-28 Feb 75,
Carl Accardo, and John Dulchinos. Mar 75, 33p AFCRL-TR-75-0295
Contract F19628-74-C-0047

Descriptors: *Atmospheric electricity, Booms(Equipment), Deployment, Electric fields, Electronic equipment, Printed circuits, Sounding rockets, Atmospheric sounding, Ionosphere.

This report describes a program to pursue research in the area of atmospheric electric field measurements on board a sounding rocket. The effort represents a continuation of an earlier program carried out under contract AF 19628-6132 during 1971 and 1972. A major difference in the two programs has been the change from a hinged type boom system deployed from a spinning rocket to a motor driven Stacer type (unfurlable) system. Changes in the electronics were also accomplished during the program. This report includes descriptive material and the pertinent documentation for the period July 1973 through February 1975.

AD-A011 705/1GA PC$4.75/MF$2.25
Florida Univ Gainesville Engineering and Industrial Experiment Station
Fundamental Atomic Mechanisms in the Polar Cap.
Rept. no. 11 (Final) 1 Jul 74-31 Mar 75,
Alex E. S. Green. 1 Apr 75, 98p AFCRL-TR-75-0201
Contract F19628-75-C-0022

Descriptors: *Atmospheric chemistry, *Proton scattering, *Nitrogen, *Energy transfer, Proton capture, Polar cap, Monte Carlo method, Excitation, Cross sections, Aurorae, Hydrogen.

The 'detailed atomic cross section' (DACS) approach to proton energy deposition in N2 is extended by calculations of angular differential

elastic cross sections for proton and hydrogen atom impact below 1 keV. These cross sections serve as a necessary input to Monte Carlo computations of the spatial aspect of the proton energy deposition. A detailed comparison of Monte Carlo and continuous slowing down approximation methods has been carried out to determine the importance of the stochastic and discrete nature of the energy loss process for protons at energies of 1 keV and lower. The comparison considers the gross features such as the efficiency for the excitation of a given state of N2 as well as more detailed features such as the spatial distribution for the rate of excitation of a given state. The detailed nature of the Monte Carlo model used allows the determination of the proton and hydrogen atom differential flux as a function of position. Analytical representations of these flux components provide a simple means for the transmission of the vast amount of data generated in the Monte Carlo computations.

AD-A011 710/1GA PC$4.25/MF$2.25
Regis Coll Weston Mass
Satellite and Rocket Experiments and Their Feasibility Studies. Auroral Ionospheric Fields and Plasma Studies.
Final rept. 1 Aug 73-31 Jan 75,
Mukhtar Ahmed, Harold P. Mahon, and Delia DuLong. 28 Feb 75, 59p AFCRL-TR-75-0184
Contract F19628-74-C-0041

Descriptors: *Ionosphere, *Ionospheric disturbances, *Aurorae, Sounding rockets, Scientific satellites, Magnetic storms, Electron density, Electric fields, Particle flux, Polar regions.
Identifiers: INJUN 5 satellite, ISIS-1 satellite, E region.

This report covers studies of the global morphology of ionization in the altitude region 500 to 10,000 km in the low, middle, and polar latitude regions and studies of electric field in the high latitude region to investigate the physical processes operating during quiescent magnetic conditions and during geophysically disturbed periods.

AD-A011 714/3GA PC$3.75/MF$2.25
California Univ Los Angeles Inst of Geophysics and Planetary Physics
A Multistation Sampled Data Acquisition and Transmission System for Studies of ULF Waves.
Scientific rept.,
George A. Ioannidis, Joseph D. Means, Francis R. George, and Robert C. Snare. 21 Mar 75, 46p Rept nos. IGPP-1421-70, Scientific-2 AFCRL-TR-75-0173
Contract F19628-72-C-0175

Descriptors: *Magnetosphere, *Data processing, Geomagnetism, Ultralow frequency, Data processing equipment, Magnetometers, Data acquisition, Error correction codes, Data storage systems, Data transmission systems, Construction, Fabrication.
Identifiers: Design, Sampled data systems.

The development of a multistation sampled data acquisition and transmission system designed for studying the longitudinal extent and propagation characteristics of ULF waves (.001 to 2.5 Hz), observed on the earth's surface, is presented. A one-error correcting Hamming code with bit interleaving among the codewords in the same transmission block is shown to provide adequate protection against the errors introduced by noise in the telephone line which serves as the communications link among the stations. The implementation of the automatic sampling of the analog magnetometers, the encoding and decoding of the data, and the generation and detection of pseudo-random sequences for synchronization, using integrated circuit technology and microprocessors is briefly described.

AD-A011 719/2GA PC$4.25/MF$2.25
Lowell Technological Inst Research Foundation Mass
Airborne and Ground Based Arctic Digital Ionospheric Sounding.
Final rept. 1 Oct 73-30 Jun 74,
Klaus Bibl, and Bodo W. Reinisch. Oct 74, 58p Rept no. LTIRF-368/IP AFCRL-TR-74-0563
Contract F19628-74-C-0007

Descriptors: *Ionosphere, *Radio waves, *Atmospheric sounding, Wave propagation, Height, Frequency, Doppler effect, Backscattering, Angle of arrival, Arctic regions, Graphs.
Identifiers: E region, F region, Ionograms.

High frequency radio wave propagation studies at Goose Bay, Labrador and between Goose Bay and an instrumented KC-135 aircraft are discussed. Both power- and phase-coherent detection schemes were applied to investigate the coherence of the ionospheric echoes. Backscatter ionograms were recorded in this dynamic environment using digital power-integration techniques. Stable synchronization between the ground station and the aircraft enabled the recording of swept frequency oblique ionograms over distances of up to 3000 km. Alternating with vertical and oblique incidence ionograms, Doppler and angle of arrival measurements were carried out at the ground on multiple fixed frequencies transmitted with the aircraft's Digisonde-drift system.

AD-A011 763/0GA PC$3.75/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
Moment-Transport Equations for Wave-Particle Interactions in the Magnetosphere.
Interim rept.,
John M. Cornwall. 15 May 75, 41p Rept no. TR-0075(5260-20)-6 SAMSO-TR-75-138
Contract F04701-74-C-0075

Descriptors: *Magnetosphere, *Charged particles, *Electromagnetic radiation, Interactions, Transport properties, Plasmas(Physics), Distribution functions, Dispersion relations, Instability.

The particle transport equation which describes radial diffusion combined with quasi-linear diffusion by waves is analytically intractable, and is usually dealt with by fixing a priori either the radial transport term or the wave diffusion term. However, by taking moments of the transport equation it is possible to estimate the wave intensity and wave diffusion coefficient in a simple way in terms of the particle transport and loss processes. Substituting these estimates in the moment equations, one derives a series of radial transport equations (in general, non-linear) for moments of the distribution function: the number density, the average energy, and the average perpendicular energy.

AD-A011 764/8GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
Quasi-Exospheric Heat Flux of Solar-Wind Electrons.
Interim rept.,
Aharon Eviatar, and Michael Schultz. 15 May 75, 25p Rept no. TR-0075(5260-20)-5 SAMSO-TR-75-139
Contract F04701-74-C-0075, Grant NSF-GA-34148
Sponsored in part by Contract NGR-05-007-190.

Descriptors: *Solar wind, *Exosphere, Electron flux, Heat flux, Electrostatic charge, Magnetic fields, Plasma oscillations, Velocity, Density, Potential energy, Maxwells equations.

Density, bulk-velocity, and heat-flow moments are calculated for truncated Maxwellian distributions representing the cool and hot populations of solar-wind electrons, as realized at the base of a hypothetical exosphere. The electrostatic potential is thus calculated by requiring charge quasi-neutrality and the absence of electrical current. Plasma-kinetic coupling of the cool-electron and proton bulk velocities leads to an increase in the electrostatic potential and a decrease in the heat-flow moment.

AD-A011 830/7GA PC$5.25/MF$2.25
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Use of the Atmospheric Electric Field for Terrain Avoidance.
Technical rept.,
C. S. Leffel, Jr., and M. L. Hill. Apr 75, 124p Rept no. APL/JHU-TG-1271
Contract N00017-72-C-4401

Descriptors: *Atmospheric electricity, *Navigation reference, Atmosphere models, Terrain avoidance, Electric fields, Atmospheric physics, Measurement.

Both natural and man-made orographic protrusions perturb the normally vertical atmospheric electric field. The magnitude and direction of the electric field perturbations have been computer for such protrusions as walls and small mountains. A limited number of measurements made near ground level and from an instrumented aircraft show that the atmospheric field in the neighborhood of orographic protrusions behave as expected. From theoretical calculations of the atmospheric field and ground-based and laboratory measurements. The authors infer that an aircraft or missile in flight would be able to detect perturbations useful in terrain avoidance at ranges of five times the height of a typical mountain ridge if the vehicle is on a horizontal flight path lying well below the ridge altitude. The range of atmospheric and terrain conditions for which this inference is valid cannot be accurately specified on the basis of data now available.

AD-A011 932/1GA PC$3.75/MF$2.25
Textron Inc Buffalo N Y Bell Aerospace Div
MESA Accelerometer for Atmosphere Explorer Satellites.
Final rept. 17 Sep 71-15 Jan 75,
William G. Lange. 15 Jan 75, 42p Rept no. 6273-928034 AFCRL-TR-75-0204
Contract F19628-72-C-0096

Descriptors: *Accelerometers, Scientific satellites, Atmospheric density, Measurement, Magnetosphere.
Identifiers: Explorer satellites.

The report describes development fabrication and test of the MESA accelerometer experiment for use in the Atmosphere Explorer Satellite series over the period 17 September 1971 through 15 January 1975. A total of three, 3 Axis accelerometer experiment packages and two sets of Ground Support Equipment were delivered to AFCRL. The first experiment was placed in orbit on 'C' Atmosphere Explorer satellite in December 1973. The second two experiments have been integrated with the 'D' and 'E' spacecraft, which are scheduled for launch during the late half of 1975. The 'C' spacecraft remains in orbit at this date. Data received thus far, indicate the experiment is operating as predicted. The MESA experiment is designed to measure atmospheric density over the entire altitude range expected in the Atmosphere Explorer series. In addition, it will also measure satellite acceleration from the Orbital Adjust Propulsion System (OAPS).

AD-A011 950/3GA PC$3.25/MF$2.25
Utah Univ Salt Lake City Dept of Chemistry

Atmospheric Corrosion,
Henry Eyring, Blake Robertson, Chih Chien Chu, and Terrell Andersen. 17 Sep 73, 4p ARO-3383.35-C
Grants DA-ARO-D-31-124-72-G15, NIH-GP-12862
Availability: Pub. in Proceedings of the National Academy of Sciences of the United States of America, v71 n2 p245-247 Feb 74.

Descriptors: *Atmospheric corrosion, Oxides, Surface chemistry, Catalysis, Models, Reprints.

A model of electrolytic corrosion is developed. It is shown that electrically conducting channels threading through the oxide layer and connecting anodic and cathodic areas, obey the equation for a reactant being catalyzed by its product. The resulting autocatalytic equation is compared with available experimental data and found to be widely applicable and capable of unifying many experimental observations. (Author)

AD-A012 002/2GA PC$4.75/MF$2.25
Air Force Weapons Lab Kirtland AFB N Mex
Analytic and Numerical Chemistry Algorithms for the WORRY Code. WORRY Document No. 2.
Final rept. 1 Jan 71-15 Jul 74,
David W. Goetz, William A. Whitaker, Charles E. Ragan, and Peter W. Lunn. Jun 75, 99p Rept no. AFWL-TR-74-204

Descriptors: *Atmospheric chemistry, *Algorithms, Nuclear explosions, Nitrogen oxides, Nonlinear differential equations, Reaction kinetics, Computer programs, Nitrogen, Oxygen, Atmosphere models, Atoms, Ions, Molecules.
Identifiers: *Nuclear explosion effects, Reaction rates.

The WORRY Chemistry Package computes the nonequilibrium chemical behavior of a parcel of air in a quiescent or disturbed environment. Such a computation requires the solution of a set of nonlinear coupled differential equations derived from the set of reactions in which the atomic and molecular species of the parcel participate. The Chemistry Package may solve this set of differential equations by either of two methods: a standard numerical integration or an analytic algorithm. The procedures used in the analytic algorithm are described in detail and comparisons with the numerical solutions are shown.

AD-A012 052/7GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park Ionosphere Research Lab
Comparison of High-Latitude and Mid-Latitude Ionospheric Electric Fields,
L. A. Carpenter, and V. W. J. H. Kirchhoff. 2 Aug 74, 5p
Contract N00014-67-A-0385-0017, Grant NGL-39-009-003
Availability: Pub. in Jnl. of Geophysical Research, v80 n13 p1810-1814, 1 May 75.

Descriptors: *Ionosphere, *Magnetosphere, Electric fields, Variations, Comparison, High latitudes, Alaska, Massachusetts, Incoherent scattering, Correlation techniques, Reprints.
Identifiers: *F region, Midlatitudes.

Simultaneous measurements of the F region electric field by the incoherent scatter technique have been made at Chatanika, Alaska (65.1 deg N, 147.5 deg W), and Millstone Hill, Massachusetts (42.6 deg N, 71.5 deg W), on July 18-19 and August 7-8, 1973. Good correlation was observed in the time variation of the perpendicular electric field at the two stations. Magnetic conditions for these days were relatively quiet with some variations evident from the high-latitude magnetograms and the Chatanika radar, but no distinct effect appeared on the mid-latitude magnetograms. Since magnetospheric electric fields are thought to be the source of high-latitude electric fields such as those observed at Chatanika, the good correlation in the perpendicular electric field for the two stations indicates that the magnetospheric originated electric fields have an appreciable effect down to at least L = 3.2.

AD-A012 195/4GA PC$4.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Atmospheric Density Determination from Analysis of Doppler Beacon Satellite Data.
Special rept.,
James N. Bass, Krishin H. Bhavnani, and Isabel M. Hussey. 1 Apr 75, 60p Rept nos. AFCRL-SR-191, AFCRL-TR-75-0176

Descriptors: *Atmospheric density, *Navigation satellites, Determination, Radio beacons, Scientific satellites, Doppler systems, Data processing, Computer programs, Orbits, Satellite tracking systems.
Identifiers: Doppler beacon satellites, CADNIP computer program, CELEST computer program, DB-7 satellites, DB-8 satellites, DB-9 satellites.

Atmospheric densities are computed from analysis of Doppler beacon satellite data. Modifications to Doppler beacon data processing program CELEST necessary for this study are described. Results obtained for satellites DB-7(6382), DB-8(6727), and DB-9(6928) are found to be in good agreement with those obtained by analysis of skin track data for the same satellites using program CADNIP. (Author)

AD-A012 249/9GA PC$4.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Asymptotic Directions and Vertical Cutoff Rigidities for Selected Cosmic-Ray Stations as Calculated Using the Finch and Leaton Geomagnetic Field Model.
Environmental research papers,
M. A. Shea, and D. F. Smart. 1 Apr 75, 99p Rept nos. AFCRL-TR-75-0177, AFCRL-ERP-502

Descriptors: *Cosmic rays, *Geomagnetism, Charged particles, Tables(Data), Particle trajectories, Mathematical models, Vertical orientation, Asymmetry, Directional, Rigidity, Digital computers, Ray tracing, Computerized simulation, Observatories.
Identifiers: Cosmic ray stations, Geomagnetic cutoff rigidity, Asymptotic directions.

Tables of asymptotic directions and vertical cutoff rigidities for a selected set of cosmic-ray stations are presented. These values were obtained by the integration of vertically incident cosmic-ray trajectories through the Finch and Leaton (Epoch 1955) quiescent model of the geomagnetic field. The table of asymptotic directions contains the asymptotic latitudes and longitudes that specify the direction of approach from interplanetary space of a cosmic-ray particle. These asymptotic directions are given for specific rigidities above the main cone cutoff rigidity for each station, and at 0.01 GV rigidity intervals throughout the penumbra. Maps of the symptotic directions for each station are included. The table of vertical cutoff rigidities contains the geographic coordinates and L value of each cosmic-ray station together with the main cone cutoff rigidity, the Stoermer cutoff rigidity, and the effective cutoff rigidity. (Author)

AD-A012 263/0GA PC$3.25/MF$2.25
Alaska Univ College Geophysical Inst
The Continuity of the Auroral Oval in the Afternoon Sector,
A. L. Snyder, S.-I. Akasofu, and D. S. Kimball. 3 Jun 74, 8p Rept no. UAG-Contrib-A444 AFCRL-TR-75-0353
Contract F19628-72-C-0301, Grant NSF-GV-29355
Availability: Pub. in Planetary and Space Science, v23 p225-227 1975.

Descriptors: *Aurorae, Spatial distribution, Ellipses, Time dependence, Antarctic regions, Meteorological satellites, Panoramic photographs, Reprints.
Identifiers: All sky cameras, *Auroral oval, South pole station.

United States Air Force DMSP satellite auroral images and South Pole auroral all-sky camera data are presented to provide new direct evidence that the afternoon sector auroras lie within a continuous oval belt. An example is also presented to illustrate that afternoon substorm auroras occur within the auroral oval configuration. (Author)

AD-A012 291/1GA PC$4.25/MF$2.25
Analysis and Computer Systems Inc Burlington Mass
An Investigation of the Determination of Thermospheric Densities by Solar EUV Absorption.
Interim rept.,
Peter W. Lindstrom. Apr 75, 70p Rept no. Scientific-1 AFCRL-TR-75-0235
Contract F19628-74-C-0169

Descriptors: *Thermosphere, *Solar ultraviolet radiation, *Atmospheric density, Temperature, Wavelengths, Intensity, Profiles, Mathematical models, Absorption coefficients.

Analyzed are various techniques for determining the number densities of atmospheric constituents. The experimental data that these techniques employ are absorption profiles of EUV solar radiation. One method analyzed is that of computing the densities by solving the linear extinction coefficient equations. Methods that assume diffusive equilibrium and a knowledge of the temperature profile are also analyzed. A method of determining an optimal payload of wavelength detectors to be used for computing the densities in a manner which minimizes the effect of the statistical uncertainty in the absorption profiles is presented.

AD-A012 331/5GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Effective Electron Loss Coefficient of the Disturbed Daytime D Region,
W. Swider, and W. A. Dean. 31 Jul 74, 6p Rept no. AFCRL-TR-75-0364
Availability: PUb. in Jnl. of Geophysical Research, v80 n13 p1815-1819, 1 May 75.

Descriptors: *D region, *Electron density, *Ionization, Day, Ionospheric disturbances, Protons, Solar disturbances, Electron flux, Reprints.
Identifiers: Effective electron loss coefficient.

The effective electron loss coefficient of the D region is determined as a function of height for four daytime instances over a 49-hour time span during the November 2-5, 1969, solar proton event (SPE). The four altitude profiles of this coefficient are seen to be in very good agreement with one another, suggesting that at least for this SPE the average profile is a characteristic function of the disturbed D region over a considerable ionization production rate range. The results are compared with the determinations of several other groups. The behavior of the loss coefficient at twilight and night is briefly discussed.

AD-A012 332/3GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass

Ejecta from Large Craters on the Moon: Discussion,
M. Settle, J. W. Head, and T. R. McGetchin. 2 Aug 74, 5p Rept no. AFCRL-TR-75-0361
Availability: Pub. in Earth and Planetary Science Letters, v23 p271-274 1974.

Descriptors: *Lunar geology, *Craters, *Ejecta, Thickness, Sizes(Dimensions), Moon, Mathematical models.
Identifiers: Historical geology.

AD-A012 353/9GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Applied Physics and Information Science
Topside Ionosphere.
Final rept. Nov 72-Jul 74,
Peter M. Banks, and Robert W. Schunk. Aug 74, 7p
Contract N00014-69-A-0200-6042, ARPA Order-2266

Descriptors: *Ionosphere, Ion density, Ions, Ion exchange, Transport, Heat flux, Stresses, Continuity, Velocity.
Identifiers: E region, F region.

Behavior of ion velocity distributions for a simple collision model, transport equations for aeronomy, and temperature and density structure of thermal proton flows are briefly reviewed.

COM-75-10709/4GA PC$3.25
Delhi Univ. (India). Dept. of Physics and Astrophysics.
Some Estimates of Gravity-Wave Associated Neutral Particle Velocity Perturbations in the F2-Region Over Delhi,
O. P. Nagpal, A. B. Gupta, and C. S. G. K. Setty. 3 Dec 73, 11p NOAA-75051208
Contract ESSA-E128-69(N)
Pub. in Jnl. of Atmospheric and Terrestrial Physics, v35 p1147-1156 Jul 74.

Descriptors: *Gravity waves, *F 2 region, Electron density(Concentration), Electrons, Particle flux, Ionospheric disturbances, Ionosphere, Geomagnetism, India.
Identifiers: Delhi(India), *Traveling ionospheric disturbances.

Atmospheric gravity waves of periods between 8-70 min observed over Delhi are found to produce electron density perturbations of the order of a few per cent. These estimates along with the measured wavelengths have been used to calculate the wave-associated neutral-particle velocity perturbations. These velocities are found to be of the order of a few m/sec and to decrease with increasing wave period. The associated electron-density perturbations, on the other hand, increase with increasing wave period. The simplest models of the anisotropic response of the ionosphere to gravity waves are not sufficient to explain this observed behavior. However, wave-period-dependent dissipation, when taken into account, seems to explain this satisfactorily.

COM-75-10727/6GA PC$3.75/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Space Environment Lab.
Geomagnetic Forecasting Based on EUV Coronal Intensity.
Technical rept.,
Larry J. Gardner. Apr 75, 28p NOAA-TR-ERL-320, SEL-33 NOAA-75051407
Paper copy also available from GPO as C55.13: ERL 320-SEL-33.

Descriptors: *Solar corona, *Geomagnetism, Magnetic fields, Solar wind, Electric corona, Electron density(Concentration), Models, Scientific satellites, Forecasting.
Identifiers: OSO-7 satellite.

A physical model is presented that relates coronal EUV intensity to the geomagnetic index, A sub p, when A sub p < 30. This model allows the prediction of A sub p with an accuracy of plus or minus 5, an average of 3 days in advance, 60 percent of the time. The correlation coefficient between forecasted and observed A sub p was 0.3 for 514 forecasts. The root-mean-square error of the forecasts was 6.8. This figure represents an improvement over the current subjective forecasting method.

COM-75-10747/4GA PC$5.25/MF$2.25
Colorado State Univ., Fort Collins. Dept. of Atmospheric Science.
GATE Convection Subprogramme - Field Phase Report,
Alan K. Betts, and David R. Rodenhuis. Feb 75, 113p
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. GATE Project Office, and National Science Foundation, Washington, D.C. Report on Global Atmospheric Research Program, Atlantic Tropical Experiment.

Descriptors: *Atmospheric sounding, *Atmospheric circulation, *Convection, *Upper atmosphere, Research projects, Meteorological balloons, Meteorological satellites, Meteorological radar, Cloud cover, Weather reconnaissance aircraft, Ships, Tropical regions, Field tests, Objectives, Tables(Data).
Identifiers: GATE project, GARP project, Dakar(Senegal), SMS satellites.

A summary is given of the in-field decisions affecting the GATE Convection Subprogramme (C.S.P.) objectives. A preliminary tabulation and discussion of the data collection is made, and a discussion of the work of the Special Analysis Group in Dakar is given. Preliminary tables are presented of the upper air data coverage for the B and A/B ship arrays, the C-band ship radars, the SMS satellite coverage and the multi-aircraft missions flown in support of the C.S.P. A preliminary assessment of the subprogramme observational objectives is given.

COM-75-10801/9GA PC$3.75/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
Dependence of High Latitude Spread-F Occurrence on Solar and Magnetic Activity,
Robert M. Davis, Jr. Nov 73, 36p OTR-73-23
Sponsored in part by Electronic Systems Div., Hanscom AFB, Mass. Paper copy also available from GPO.

Descriptors: *Ionosphere, *Spread F, *F region, *Magnetosphere, Geomagnetism, Solar activity, Charts, Maps, Diurnal variations, Mapping, Auroras.
Identifiers: Magnetic activity.

The ionosphere at high latitudes imposes unique limitations on sky-wave and trans-ionospheric radio signals in the HF and higher bands. One of these limitations is the diffuse echoes, called 'spread-F', caused by ionization irregularities in the F-region. The likelihood of such echoes is estimated from data taken at the worldwide network of vertical-incidence ionosondes. The probability of spread-F is incorporated in numerical maps for the season comprising August, September, and October in the two years 1958 and 1964, years of high and low solar activity. Separate maps are developed for quiet and moderately active magnetic conditions.

COM-75-10857/1GA PC$7.00/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Environmental Research Labs.
Atmospheric Physics and Chemistry Laboratory: Collected Reprints 1973.
Nov 74, 182p NOAA-75052304
Paper copy also available from GPO.

Descriptors: *Atmospheric physics, *Atmospheric composition, *Meteorological data, Precipitation(Meteorology), Aerosols, Ice formation, Nucleation, Cloud seeding, Solar radiation, Mathematical models, Storms, Climate, Ozone, Snow, Humidity, Remote sensing, Abstracts.
Identifiers: Reprints.

The report is a collection of 33 reprints for 1973 on the subject of atmospheric physics and chemistry. Included in this volume are articles on atmospheric composition, transport mechanisms, precipitation, aerosols, radiation, ozone, radiometry, seeding, and snow crystal formation.

N75-23965/7GA PC$3.25/MF$2.25
Defence Research Establishment Valcartier (Quebec).
Deformation of the Atmosphere by Intense Laser BEAMS at 10.6 Microns Deformation Par l'Atmosphere des Faisceaux Laser Intenses a 10.6 Microns.
L. R. Bissonnette. Mar 74, 21p DREV-TN-2099/74
In French; English Summary.

Descriptors: *Atmospheric attenuation, *Atmospheric effects, *Laser applications, *Photon beams, *Pulsed lasers, Hydrodynamic equations, Mathematical models, Maxwell equation, Similarity theorem, Wave propagation.

For abstract, see STAR 1315

N75-24209/9GA PC$4.25/MF$2.25
Iowa Univ., Iowa City. Dept. of Physics and Astronomy.
Electron Precipitation in the Post Midnight Sector of the Auroral Zones.
L. A. Frank, N. A. Saflekos, and K. L. Ackerson. Apr 75, 53p NASA-CR-142812, U-OF-IOWA-75-17
Contracts NAS5-10625, NAS1-8141

Descriptors: *Auroral zones, *Electron precipitation, *Energy spectra, *Explorer 40 satellite, Angular distribution, Electron flux density, Magnetic storms.

For abstract, see STAR 1315

N75-24210/7GA PC$3.75/MF$2.25
Pennsylvania State Univ., University Park. Ionospheric Research Lab.
Ionospheric Research.
Semiannual Status Report, 1 Oct 1974 - 31 Mar. 1975.
31 Mar 75, 48p NASA-CR-142830, SASR-1
Contracts NAS6-2602, NGR-39-009-032

Descriptors: *D region, *E region, *F region, Mass spectrometers, Wave propagation.

For abstract, see STAR 1315

N75-24211/5GA PC$5.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Catalog of Particles and Fields Data 19581965.
M. L. King. Jun 75, 142p NASA-TM-X-72574, NSSDC-75-02

Descriptors: *Bibliographies, *Electric fields, *Magnetic fields, Bow waves, Electromagnetic fields, Geomagnetism, Magnetically trapped particles, Particles, Space laboratories.

For abstract, see STAR 1315

N75-24212/3GA PC$7.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Catalog of Particles and Fields Data 1966-1973.
M. L. King. Jun 75, 202p NASA-TM-X-72575, NSSDC-75-03

Descriptors: *Bibliographies, *Electric fields, *Magnetic fields, Bow waves, Electromagnetic fields, Geomagnetism, Magnetically trapped particles, Particles, Space laboratories.

For abstract, see STAR 1315

N75-24214/9GA PC$4.25/MF$2.25
Kiruna Geophysical Observatory (Sweden).
Kiruna Geophysical Data.
Data Summary, Jul. - Sep. 1974.
G. Gustafsson. Sep 74, 65p REPT-74/7-9

Descriptors: *Geophysical observatories, *Polar regions, *Sweden, *Upper atmosphere, Atmospheric ionization, Auroras, Cosmic rays, Geomagnetism, Ionospheric propagation, Tables (Data).

For abstract, see STAR 1315

N75-24215/6GA PC$4.25/MF$2.25
Kiruna Geophysical Observatory (Sweden).
Kiruna Geophysical Data.
Data Summary, Oct. - Dec. 1974.
G. Gustafsson. Dec 74, 69p REPT-74/10-12

Descriptors: *Geophysical observatories, *Polar regions, *Sweden, *Upper atmosphere, Atmospheric ionization, Auroras, Cosmic rays, Geomagnetism, Ionospheric propagation, Tables (Data).

For abstract, see STAR 1315

N75-24526/6GA PC$8.50/MF$2.25
McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
Zero-Gravity Atmospheric Cloud Physics Experiment Laboratory; Programmatics Report.
Sep 74, 266p NASA-CR-120725, MDC-G5456
Contract NAS8-30272

Descriptors: *Atmospheric physics, *Cloud physics, *Weightlessness, Computer programs, Costs, Research and development, Technology transfer.

For abstract, see STAR 1315

N75-24644/7GA PC$3.75/MF$2.25
Wolf Research and Development Corp., Riverdale, Md.
The Investigation of O and N2 Densities from the OSO-7 Extreme Uv Data.
Final Report.
3 Feb 75, 36p NASA-CR-142759, WOLF-00079
Contract NASW-2595

Descriptors: *Atmospheric density, *Nitrogen, *Oso-7, *Oxygen, *Ultraviolet spectra, Atmospheric models, Exosphere, Orbital mechanics, Solar radiation.

For abstract, see STAR 1315

4B. Meteorology

AD-A011 745/7GA PC$3.25/MF$2.25
Scripps Institution of Oceanography La Jolla Calif
Effective Cloudness Derived from Ocean Buoy Data,
J. C. K. Huang, and J. M. Park. 13 Feb 74, 9p
Rept no. IDOE75-402
Contracts N00014-75-C-0260, N00014-69-A-0200-6043
Availability: Pub. in Jnl. of Applied Meteorology, v14 n2 p240-245 Mar 75.

Descriptors: *Cloud cover, *Solar radiation, *Ocean surface, Remote detectors, Mooring buoys, North Pacific Ocean, Recording systems, Air water interactions, Oceanographic data, Reprints.

There is a need in the study of the dynamic aspects of radiation balance at the sea surface for cloud cover information on a finer scale than is presently available, especially for analyses of historic data. Although cloud cover is difficult to obtain without a human observer, or more recently without a satellite, insolation can be readily measured and recorded by an untended instrument. Cloud cover can then be estimated by using well-known formulas usually for calculating insolation from known cloud cover. An example of such a computation on a daily basis is presented here using insolation data from deep-moored instrument stations in the North Pacific Ocean. The effective cloudiness thus obtained is used to calculate the radiation balance at the sea surface. (Author)

AD-A011 760/6GA PC$5.75/MF$2.25
IBM Federal Systems Div Gaithersburg Md
Global Weather Modeling with Vector Spherical Harmonics.
Final rept. 30 Nov 73-28 Feb 75,
Sven Biorklund, N. Pleszkoch, and F. Testa. 28 Apr 75, 142p AFOSR-TR-75-0674
Contract F44620-74-C-0036, ARPA Order-2633

Descriptors: *Weather forecasting, *Atmosphere models, Meteorological data, Mathematical models, Vector analysis, Three dimensional, Harmonic analysis, Legendre functions, Polynomials, Diurnal variations, Truncation, Global.
Identifiers: Spherical harmonics, Divergence.

A three-dimensional spectral global weather prediction model based on the Mintz-Arakawa model, using vector spherical harmonics has been used for prediction with real data.

AD-A011 878/6GA PC$6.25/MF$2.25
Hawaii Inst of Geophysics Honolulu
The Trade Wind Field Over the Pacific Ocean. Part II. Bimonthly Fields of Wind Stress: 1950 to 1972,
Klaus Wyrtki, and Gary Meyers. Apr 75, 161p
Rept no. HIG-75-2
Contract N00014-67-A-0387-0017
Sponsored in part by National Science Foundation, Washington, D.C. Office for the International Decade of Ocean Exploration. See also Part 1, AD-A008 579.

Descriptors: *Wind, *Pacific Ocean, Wind velocity, Stresses, Wind shear, Periodic variations, Weather stations, Marine meteorology, Equatorial regions, Time series analysis, Anomalies, Meteorological charts.
Identifiers: *Tradewinds, North Pacific experiment.

The trade wind field over the Pacific Ocean between 30N and 30S has been studied on the basis of five million wind observations taken from ships. Data were averaged for areas of 2 degrees latitude and 10 degrees longitude to resolve adequately the north-south gradients in the wind field. Bimonthly mean maps of the wind stress vector were produced for the period from 1950 to 1972. Indices of the size and overall strength of the northeast and the southeast trades are defined, and time series of these indices are presented for the period from 1948 to 1972. Interannual variations and the most outstanding seasonal anomalies in the trade wind field are discussed briefly.

AD-A012 054/3GA PC$3.25/MF$2.25
Louisiana State Univ Baton Rouge Coastal Studies Inst
Wind Stress on Nearshore and Lagoonal Waters of a Tropical Island.
Technical rept.,
S. A. Hsu. 11 Apr 74, 6p Rept no. TR-192
Contract N00014-69-A-0211-0003
Availability: Pub. in Limnology and Oceanography, v20 n1 p113-115 Jan 75.

Descriptors: *Wind shear, Shallow water, Shear stresses, Wind velocity, Marine meteorology, Coastal regions, Open water, Barbados, Wind direction, Shielding, Inshore areas, Coral reefs, Energy transfer, Tropical regions, Air water interactions, Reprints.
Identifiers: Trade winds, Lagoons(Landforms), Wind stress.

Wind profiles were measured over a windward lagoon and a quasi-leeward area in Barbados, West Indies, under the prevailing trade winds. Relationships between shear and wind velocities for these environments were determined. Under average wind conditions the shear stress on these coastal waters is about 72% of that of an oceanic region. (Author)

AD-A012 105/3GA PC$6.25/MF$2.25
National Climatic Center Asheville N C
Ceiling-Visibility Climatological Study and Systems Enhancement Factors.
Final rept.
Jun 75, 155p
Contract DOT-FA75WAI-547
See also report dated Jun 73, AD-776 871.

Descriptors: *Ceiling, *Visibility, *Landing fields, Meteorological data, Tables(Data), Diurnal variations, Airports, Climate, Aviation safety.
Identifiers: DOT/4CZ/CA, DOT/4GC/GA.

The purpose of the report is to provide climatological information as an aid in making Facilities and Equipment (F and E) investment decisions. Ceiling and visibility data from 271 airports were examined over periods ranging from 5 to 15 years. The percent of time various categories (VFR, IFR, ILS, VOR) occurred is shown by month and by hour groups; 07-13, 14-21, and 22-06 LST. Although most of the tables are based on 24 weather observations a day, observing and digitizing practices restrict some to 8 or 14 observations.

AD-A012 304/2GA PC$3.75/MF$2.25
Kaysam Corp of America Paterson N J
Production Engineering Measure for Manufacture of Meteorological Balloons Type ML-566 (XE3)/AM.
Quarterly progress rept. no. 4, 1 Feb-30 Apr 75,
John Kantor. May 75, 26p
Contract DAAB07-74-C-0329
See also Quarterly progress rept. no. 3 dated Feb 75, AD-A008 443.

Descriptors: *Meteorological balloons, Production engineering, Natural rubber, Latex, Storage, Performance(Engineering), Thickness, Quality control, Test equipment, Manufacturing, Pilot plants, Acceptability.
Identifiers: *Production engineering measures.

The program progressed in the fourth quarter in the following sections: An evaluation of natural latex balloon components made with a compound having high storage stability, showed erratic flight performance. Work was conducted in the problem area relating to effect of cure on wall thickness. Work in the problem area relating to retalcing of balloons was successful in eliminating 'stuck spots'. A design and drawings were completed of production equipment for retalcing components for the ML-566(XE3)/AM balloon. Thirty first articles were fabricated and delivered to designated destinations. Tests were conducted on first article

samples and a first article test report was submitted.

AD-A012 346/3GA PC$3.75/MF$2.25
Transportation Systems Center Cambridge Mass
Fog Bank Detector Field Tests: A Technical Summary.
Technical rept. Sep 71-Dec 71,
Jack R. Lifsitz, and Melvin Y. Yaffee. Dec 71, 36p Rept no. TSC-USCG-72-2
Contract DOT-CG-202

Descriptors: *Fog, *Optical radar, *Optical detectors, Ruby lasers, Gallium arsenide lasers, Radiometers, Infrared detectors, Background, Radiance, Reliability(Electronics), Backscattering, California, Performance(Engineering).
Identifiers: DOT/4GZ/GA, DOT/4IZ/IE, Point Bonita, Design, *Fog bank detectors.

The report summarizes the results of field experiments performed at Pt. Bonita, California. The system under study, a laser LIDAR and a vertical-scanning infrared radiometer, have been discussed in detail in Report No. DOT-TSC-CG-71-3. Measurements of the peak power and shape of the return LIDAR pulse, and of the background levels, support the assumptions made in that report. The largest value of background spectral radiance measured, when a sunlit cloud fills the LIDAR receiver field-of-view, is 2 micro w/sq cm/A/sr (at 6943A). The infrared radiometer was found to be susceptible to ambiguities serious enough to eliminate this method from use as a reliable fog detector at the present time. Based on the laser backscatter results, a LIDAR fog bank detector, using a GaAlAs laser diode array as the transmitting source, is recommended and conclusions regarding its technical performance are presented.

AD-A012 348/9GA PC$4.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
An Evaluation of the Harbor of Yokosuka, Japan as a Typhoon Haven,
Russell J. Graff. Jun 75, 100p Rept no. ENVPREDRSCHFAC-tech paper-15-75

Descriptors: *Harbors, *Typhoons, *Marine terminals, Wind, Tropical cyclones, Ocean waves, Storms, Surges, North Pacific Ocean, Hurricane tracking, Topography, Sea states, Evasion, Ships, Japan.
Identifiers: Yokosuka(Japan), Typhoon havens, Storm surges.

The study is an evaluation of the port of Yokosuka, Japan as a typhoon 'haven.' Characteristics of the port discussed include the topographical effects on winds during the passage of tropical cyclones, port facilities, wave action and storm surge. Problems to be considered when remaining in port and possible evasion procedures for ships sortieing are examined. Tropical cyclone tracks from 1947-1973 for the western North Pacific were analyzed to determine the probability of threat to the port. The results show that the port of Yokosuka is a safe typhoon haven.

AD-A012 369/5GA PC$3.75/MF$2.25
Ocean Data Systems Inc Monterey Calif
Further Development of a 3-7 Day Typhoon Analog Forecast Model for the Western North Pacific.
Final technical rept.,
Warren S. Yogi, James M. Long, and Julius F. Steuckert. Apr 75, 37p Rept no. ODSI-674-1
ENVPREDRSCHF-TECH PAPER-12-75
Contract N66314-74-C-1390

Descriptors: *Typhoons, *Hurricane tracking, *Weather forecasting, *North Pacific Ocean, Tropical cyclones, Storms, Mathematical models, Patterns, Analogs, Regression analysis, Correlation techniques, Computer applications.
Identifiers: TYFOON 72 computer program, TYFOON 73 computer program.

The report presents the results of an investigation of typhoon movement forecasting techniques by computer. The study was accomplished in three phases: Upgrading the former data base of the existing forecast model; extending the forecast to seven days, and incorporation of 500-mb long-wave patterns for predetermination of forecast track. Recommendations regarding findings are included as part of the text.

AD-A012 376/0GA PC$8.75/MF$2.25
Naval Weather Service Detachment Asheville N C
U. S. Navy and Marine Corps Meteorological Station Climate Summaries.
Jul 75, 293p

Descriptors: *Climate, *Global, *Marine meteorology, Naval operations, Weather stations, Meteorological instruments, Sites, Tables(Data), Atmospheric temperature, Atmospheric precipitation, Snow, Humidity, Wind, Barometric pressure, Fog, Thunderstorms, Visibility, Ceiling, Hail.

The Station Climatic Summaries included in the publication generally consist of four pages per station: A narrative, a station history, and two pages of tabular material. The station history information describes the Navy installation listed at the top of the page. The degree day total for the month is the sum of the departures of the daily mean temperatures from the base of 65F. Heating degree day (HDD) data are shown only for months with temperature data for each day of the month. Cooling degree day data when shown use the same indicators as the HDD. The appearance of a flag in the snowfall columns when the minimum temperature does not support snowfall, indicates the occurrence of hail.

COM-75-10850/6GA PC$3.25/MF$2.25
National Environmental Satellite Service, Washington, D.C.
Publications and Final Reports on Contracts and Grants, NESS - 1974.
Technical memo.
Apr 75, 14p NOAA-TM-NESS-69 NOAA-75052202

Descriptors: *Atmospheric physics, *Meteorology, *Bibliographies, Technical reports, Meteorological satellites, Remote sensing, Infrared mapping, Clouds(Meteorology), Atmospheric temperature, Floods, Sea ice, Weather forecasting, Grants.
Identifiers: National Environmental Satellite Service.

The memorandum contains lists of articles and reports published for or by the National Environmental Satellite Service (NESS) during 1974. The two categories included are: Publications by staff members of NESS, 1974 and final reports on contracts and grants sponsored by NESS, 1974. Information on ordering copies of these reports is given.

COM-75-10872/0GA PC$5.75/MF$2.25
Purdue Univ., Lafayette, Ind.
A Study of Atmospheric Vortex Phenomena Associated with the Waterspout.
Final rept. 1 Jul 71-31 Mar 74,
C. R. Church, and C. M. Ehresman. Dec 74, 144p NOAA-75052006
Grant NOAA-N22-32-72(G)

Descriptors: *Tornadoes, *Vortices, Temperature measurement, Meteorological instruments, Wind(Meteorology), Atmospheric pressure, Maps, Photographs.
Identifiers: *Waterspouts.

The final report presents the results of field work, sponsored by NOAA, to study waterspout dynamics. The purpose of this report is to describe the various aspects of the measurement system and field operations, to present the scientific data and analysis, and to make appropriate recommendations for further work in this area. In addition to the discussion of the main project goals a number of other aspects of vortex phenomena presented themselves for study during the field work.

COM-75-10884/5GA PC$3.75/MF$2.25
Oklahoma Univ. Research Inst., Norman. Atmospheric Research Lab.
Temperature and Wind Variations at the WKY-TV Tower, 13 Apr 1972 to 12 June 1972,
Kit K. Wagner, and Yoshi K. Sasaki. Dec 74, 30p
WEAT-12 NOAA-75053008
Grants NOAA-04-3-022-9, NOAA-04-3-022-18

Descriptors: *Wind velocity, *Atmospheric temperature, *Wind direction, Measurement, Time series analysis, Towers, Meteorological instruments, Diurnal variations, Oklahoma.
Identifiers: Oklahoma City(Oklahoma).

Time series of horizontal wind speed and temperature measured at seven levels on a 1602-foot tall tower are shown for a two month period, 13 April 1972 to 12 June 1972. The tower is the National Severe Storms Laboratory meteorological tower facility in Oklahoma City, Oklahoma. The time series are constructed from measurements taken once every minute for the entire period. The figures show the vertical and temporal variation in temperature and wind speed.

COM-75-10905/8GA PC$3.75/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Center for Experiment Design and Data Analysis.
Parameterized Moisture and Heat Flux through Top of Bomex Volume.
Technical memo.,
Vance A. Myers. May 75, 48p NOAA-TM-EDS-BOMAP-15 NOAA-75061112

Descriptors: *Marine meteorology, *Heat transfer, *Moisture, *Tropical regions, Radiosondes, Wind(Meteorology), Enthalpy, Rainfall, Evaporation, Humidity, Water vapor, Clouds(Meteorology), Atmospheric temperature, West Indies.
Identifiers: Barbados Oceanographic and Meteorological Experiment.

A prime objective of the Barbados Oceanographic and Meteorological Experiment (BOMEX) in 1969 was to determine the budgets of moisture, enthalpy, and mass in a fixed atmospheric volume over a tropical ocean. The fluxes through the top of the volume, approximately at 500 mb, were not measured directly. A parameterization scheme is developed to estimate the top-of-volume moisture flux as a ratio to rainfall produced. The enthalpy flux is also treated briefly.

COM-75-10907/4GA PC$3.25/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Center for Experimental Design and Data Analysis.
IFYGL Physical Data Collection System: Intercomparison Data.
Technical memo.,
Jack Foreman. May 75, 12p NOAA-TM-EDS-CEDDA-3 NOAA-75060508

Descriptors: *Lake Ontario, *Marine meteorology, Buoys, Towers, Meteorological data, Surveys, Oceanographic ships, Correlation

techniques, Temperature, Atmospheric temperature, Wind velocity, Atmospheric pressure, Dew point, Water flow, Accuracy.
Identifiers: International Field Year for the Great Lakes, Johnson vessel, Lake currents.

During the International Field Year for the Great Lakes (IFYGL) 1972-73, 14 buoys and towers (equipped with automatic recording devices) were deployed in Lake Ontario as the major segment of the Physical Data Collection System (PDCS). Data from buoy intercomparisons before deployment indicate that measurements by the PDCS sensors were accurate. During the field year, the buoy system was compared with sensors aboard the U.S. S/V (survey vessel) Johnson, and the data obtained confirmed the reliability of the air- and water-temperature sensors. The wind-speed and wind-direction sensors apparently functioned properly throughout the field year, but the quality of current speed, current direction, and dew-point data deteriorated after deployment.

COM-75-10908/2GA PC$3.25/MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Center for Experiment Design and Data Analysis.
Preliminary Report on Wind Errors Encountered During Automatic Processing of IFYGL LORAN-C Data.
Technical memo.,
J. Sullivan, and J. Matejceck. May 75, 14p
NOAA-TM-EDS-CEDDA-4 NOAA-75060509

Descriptors: *Wind(Meteorology), *Atmospheric sounding, Upper atmosphere, Radiosondes, Wind velocity, Wind direction, Time lag, Loran, Data acquisition, Errors, Lake Ontario.
Identifiers: International Field Year for the Great Lakes, Loran C navigation system.

Upper air winds were measured by tracking rawinsondes over Lake Ontario during the International Field Year for the Great Lakes. The rawinsonde time-delay data, from which winds were computed, contained four primary types of errors. The frequency of errors and the correction procedures are discussed. The most frequent source of error, noisy data presumably generated from sky-wave interference, was corrected entirely by automatic procedures. Also shown is the effect of correction procedures on vertical resolution of the wind data.

COM-75-50395-09/GA MF$2.25
World Data Center A, Asheville, N.C. Meteorology.
High Altitude Meteorological Data. Volume 9, Number 9, September 1972.
Data rept.
1975, 185p NOAA-75061113
See also COM-75-50395-10.
Paper copy available from National Climatic Center, Federal Bldg., Asheville, N.C. 28801. Attn: Publications. $52.20/year, $4.35/copy (Monthly).

Descriptors: *Meteorological data, *Atmospheric sounding, Wind(Meteorology), Atmospheric temperature, Seasonal variations, Wind pressure, Acoustic velocity, Meteorological charts, Atmospheric density, Radiosondes, Networks, Tables(Data), Wind velocity.
Identifiers: High altitude.

The High Altitude Meteorological Data Reports are issed monthly by World Data Center A for Meteorology. Each report contains the wind and temperature measurements from all available high altitude meteorological sounding data for that particular month, along with computed values for pressure, density, and speed of sound. The local rawinsonde observation nearest the time of the high altitude meteorological sounding is also included when available. Statistical tables and graphs of current month means and standard deviations for all parameters with long-term means for the same month are presented immediately following the monthly observations.

COM-75-50395-10/GA MF$2.25
World Data Center A, Asheville, N.C. Meteorology.
High Altitude Meteorological Data. Volume 9, Number 10, October 1972.
Data rept.
1975, 202p NOAA-75061114
See also COM-75-50395-9 and COM-75-50395-11.
Paper copy available from National Climatic Center, Federal Bldg., Asheville, N.C. 28801. Attn: Publications. $52.20/year, $4.35/copy (Monthly).

Descriptors: *Meteorological data, *Atmospheric sounding, Wind velocity, Wind(Meteorology), Atmospheric temperature, Seasonal variations, Wind pressure, Acoustic velocity, Meteorological charts, Radiosondes, Atmospheric density, Tables(Data).
Identifiers: High altitude.

The High Altitude Meteorological Data Reports are issued monthly by World Data Center A for Meteorology. Each report contains the wind and temperature measurements from all available high altitude meteorological sounding data for that particular month, along with computed values for pressure, density, and speed of sound. The local rawinsonde observation nearest the time of the high altitude meteorological sounding is also included when available. Statistical tables and graphs of current month means and standard deviations for all parameters with long-term means for the same month are presented immediately following the monthly observations.

COM-75-50395-11/GA MF$2.25
World Data Center A, Asheville, N.C. Meteorology.
High Altitude Meteorological Data. Volume 9, Number 11, November 1972.
Data rept.
1975, 249p NOAA-75061115
See also COM-75-50395-10 and COM-75-50395-12.
Paper copy available from National Climatic Center, Federal Bldg., Asheville, N.C. 28801. Attn: Publications. $52.20/year, $4.35/copy (Monthly).

Descriptors: *Meteorological data, *Atmospheric sounding, Wind(Meteorology), Atmospheric temperature, Wind pressure, Atmospheric density, Acoustic velocity, Meteorological charts, Radiosondes, Tables(Data), Wind velocity.
Identifiers: High altitude.

The High Altitude Meteorological Data Reports are issued monthly by World Data Center A for Meteorology. Each report contains the wind and temperature measurements from all available high altitude meteorological sounding data for that particular month, along with computed values for pressure, density, and speed of sound. The local rawinsonde observation nearest the time of the high altitude meteorological sounding is also included when available. Statistical tables and graphs of current month means and standard deviations for all parameters with long-term means for the same month are presented immediately following the monthly observations.

COM-75-50395-12/GA MF$2.25
World Data Center A, Asheville, N.C. Meteorology.
High Altitude Meteorological Data. Volume 9, Number 12, December 1972.
Data rept.
1975, 211p NOAA-75061116
See also COM-75-50395-11.
Paper copy available from National Climatic Center, Federal Bldg., Asheville, N.C. 28801. Attn: Publications. $52.20/year, $4.35/copy (Monthly).

Descriptors: *Meteorological data, *Atmospheric sounding, Wind(Meteorology), Atmospheric temperature, Wind pressure, Atmospheric density, Acoustic velocity, Meteorological charts, Radiosondes, Tables(Data), Wind velocity.
Identifiers: High altitude.

The High Altitude Meteorological Data Reports are issued monthly by World Data Center A for Meteorology. Each report contains the wind and temperature measurements from all available high altitude meteorological sounding data for that particular month, along with computed values for pressure, density, and speed of sound. The local rawinsonde observation nearest the time of the high altitude meteorological sounding is also included when available. Statistical tables and graphs of current month means and standard deviations for all parameters with long-term means for the same month are presented immediately following the monthly observations.

COM-75-90008-05/GA MF$2.25
National Oceanic and Atmospheric Administration, Washington, D.C. Environmental Data Service.
Mariners Weather Log. Volume 19, Number 3, May 1975,
Elwyn E. Wilson. May 75, 71p NOAA-75052005
Paper copy available free to persons or agencies with a marine interest from the Environmental Data Service, Page Bldg. 1 (D762), 2001 Wisconsin Ave., N.W., Washington, D.C. 20235.

Descriptors: *Weather observations, *Meteorological charts, *Meteorological data, Weather communication, Weather forecasting, Weather stations, Hurricanes, Cyclones, Abstracts, Periodicals, Climate, Tables(Data), North Atlantic Ocean, North Pacific Ocean, Indian Ocean.
Identifiers: Weather logs.

The monthly periodical contains two articles, abstracted separately, and six sections on marine weather conditions. These weather data sections include Hints to the Observer, tips to the Radio Officer, Hurricane Alley, on the Editor's Desk, Marine Weather Review, and Marine Weather Diary.

COM-75-90008-05-02/GA
(Order as COM-75-90008-05)
National Oceanic and Atmospheric Administration, Washington, D.C. Environmental Data Service.
Great Lakes Navigation Season, 1974,
Elwyn E. Wilson. May 75, 12p NOAA-75052005-2
Included in Mariners Weather Log, v19 n3 May 75.

Descriptors: *Weather observations, *Navigation, *Great Lakes, Precipitation(Meteorology), Navigational aids, Ice reporting, Wind velocity, Storms, Atmospheric temperature, Seasonal variations.
Identifiers: *Water levels, Severe storms, Saint Lawrence Seaway, Welland Canal, Sault Saint Marie Locks.

The report gives a general picture of the 1974 navigation season on the Great Lakes and examines in detail such factors as precipitation, water level, weather service aids, ice, windspeed, and temperature. Finally, a monthly description is given of the more severe storms that affected the Great Lakes in 1974.

E75-10293 PC$3.75/MF$2.25
Atmospheric Environment Service, Downsview (Ontario). Atmospheric Instruments Branch.
Meteorological Data Collection via ERTS-A Data Retransmission Facilities.
Final rept.,
R. E. Vockeroth, and C. E. Robinson. 30 Oct 74, 26p NASA-CR-142837

Descriptors: Meteorological parameters, Alaska, Hydrometeorology, Data collection platforms, Climatology, EREP, Skylab program, Data transmission, Ice formation.

The author has identified the following significant results. Two meteorological data acquisition systems were built to support hydrometeorological programs related to flow forecasting. Data errors were detected in the stream level formation; these errors were caused by sensor difficulties.

N75-24228/9GA PC$4.75/MF$2.25
Oklahoma Univ., Norman. Atmospheric Research Lab.
Variational Optimization Analysis of Temperature and Moisture Advection in a Severe Storm Environment.
M. J. Mcfarland. May 75, 95p NASA-CR-141794, WEAT-16
Contract NAS9-13360

Descriptors: *Advection, *Atmospheric moisture, *Atmospheric temperature, *Storms (Meteorology), Anisotropy, Atmospheric circulation, Optimization, Potential gradients, Synoptic meteorology, Turbulent mixing, Wind variations.

For abstract, see STAR 1315

N75-24230/5GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
French Participation in the Exametnet Program Operational Implementation.
J. Latour, and B. Loitiere. Jun 75, 21p NASA-TT-F-16388
Contract NASW-2483
Tran-Transl. Into English from Proceedings of Intern. Astronautical Federation, 25TH Intern. Astronautical Congr. (Amsterdam), 30 Sep. - 5 Oct. 1974 20 p.

Descriptors: *Meteorological instruments, *Sondes, *Sounding rockets, Atmospheric temperature, France, Radiosondes, Stratosphere, Wind velocity measurement.

For abstract, see STAR 1315

N75-24231/3GA PC$5.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Weather Satellite Picture Receiving Stations, APT Digital Scan Converter.
C. H. Vermillion, and J. C. Kamowski. May 75, 105p NASA-TN-D-7994, G-7523

Descriptors: *Automatic picture transmission, *Digital to analog converters, *Meteorological satellites, Circuits, Ground stations, Man machine systems, Photographs, Radiometers, Vidicons.

For abstract, see STAR 1315

N75-24232/1GA PC$4.25/MF$2.25
Texas A&M Univ., College Station. Center for Applied Geosciences.
Relationships Between Motion on Isentropic Surfaces from 3-H Rawinsonde Data and Radar Echoes.
J. W. Overall, and J. R. Scoggins. May 75, 68p NASA-CR-2558, M-143
Contract NAS8-26751

Descriptors: *Isentropic processes, *Radar echoes, *Rawinsondes, Clouds (Meteorology), Convection, Convection clouds, Upper atmosphere, Vertical motion.

For abstract, see STAR 1315

N75-24233/9GA PC$3.75/MF$2.25
Texas A&M Univ., College Station. Center for Applied Geosciences.
Cloud Motion in Relation to the Ambient Wind Field.
Final Report.
H. E. Fuelberg, and J. R. Scoggins. May 75, 37p NASA-CR-2557
Contract NAS8-26751

Descriptors: *Clouds (Meteorology), *Wind velocity, Ionospheric sounding, Mathematical models, Trajectory analysis.

For abstract, see STAR 1315

N75-24234/7GA PC$5.25/MF$2.25
World Meteorological Organization, Geneva (Switzerland).
World Weather Watch: Seventh Status Report on Implementation.
1974, 110p WMO-401, ISBN-92-63-10401-8

Descriptors: *Data processing, *Telecommunication, *World data centers, Data acquisition, Data management, International cooperation, Meteorological parameters, Meteorological satellites, Oceanographic parameters.

For abstract, see STAR 1315

PB-242 234/3GA PC$3.75/MF$2.25
Illinois State Water Survey, Urbana.
Design of an Experiment to Suppress Hail in Illinois.
Annual rept.,
Stanley A. Changnon, Jr., Griffith M. Morgan, Neil G. Towery, and Gary L. Achtemeier. Mar 74, 47p CR-155 NSF/RA/E-74-063
Grant NSF-GI-37859

Descriptors: *Hail, *Weather modification, Weather forecasting, Thunderstorms, Meteorological radar, Cloud seeding, Identifying, Meteorological instruments, Illinois.

The project is developing the design of a hail suppression experiment in Illinois. There were several scientific accomplishments during the past year. The systems engineering approach for the two-yr project has successfully involved a carefully interlocked series of data gathering and analysis efforts. These together have focused on hailstorm forecasting, hailstorm identification with radar, classification of different storm-producing conditions, and the implications of these on a seeding system that embraces these findings with those of the past six years that addressed evaluation and surface data.

PB-242 268/1GA PC$7.00/MF$2.25
Illinois State Water Survey, Urbana.
Interim Report of METROMEX Studies: 1971-1973.
Annual rept.,
Bernice Ackerman, Herbert Appleman, Stanley Changnon, Floyd Huff, and Douglas Jones. Sep 74, 194p CR-163 NSF/RA/E-74-062
Grant NSF-GI-38317

Descriptors: *Precipitation(Meteorology), *Climatic change, *Weather modification, Urban areas, Rainfall, Hail, Thunderstorms, Atmospheric temperature, Meteorological radar, Missouri.
Identifiers: Severe storms, Saint Louis(Missouri), METROMEX(METROpolitan Meteorological EXperiment), Metropolitan meteorological experiment, Inadvertent weather modification.

The report summarizes activities and analytical results obtained in conjunction with the 1973 (summer) METROMEX operations concerning urban effects on precipitation and severe weather. Where possible, a summary of results for the three-year period, 1971-73, is presented also. Particular emphasis has been placed upon the radar analyses, since 1973 was the first year in which adequate data were collected to aid substantially in delineating the urban effect on precipitation processes. More attention also has been given to surface air and dewpoint temperature patterns than in earlier reports, since more and better data have become available, and these parameters are assuming increasing importance as a result of findings in our case studies for the 1971-73 period. Results are presented on synoptic analyses of rain events, monthly and storm rainfall, raincells (convective entities), thunderstorms, hailstorms boundary layer studies, clouds, and surface weather for the St. Louis region.

PB-242 385/5GA PC$3.75/MF$2.25
Illinois State Water Survey, Urbana.
Micro-Scale Studies of Surface Hailfall.
Final rept.,
Griffith M. Morgan, Jr., and Neil G. Towery. Mar 74, 38p CR-154 NSF/RA/F-74-060

Descriptors: *Hail, *Weather modification, Precipitation(Meteorology), Meteorological instruments, Storms, Wind velocity, Spatial distribution, Patterns, Measurement, Nebraska.
Identifiers: Kimball(Nebraska).

The project was designed to investigate the quantitative small-scale variability of hailfall parameters. A hail network of unprecedented station density was established on a section (1.0 sq mi, 2.56 sq km), of land near Kimball, Nebraska. The network consisted of 114 stations set on a grid pattern with a basic separation of 660 ft (200 m). In the southeast corner of the network, stations were set in an ultradense pattern with an average separation of 330 ft (100 m). The network was operated in May, June, and July 1973 and 3 hailstorms occurred and were studied. Great spatial variability was noted.

PB-242 385/3GA PC$3.75/MF$2.25
Illinois State Water Survey, Urbana.
Colorado-Illinois Operation and Analytical Program Utilizing a Dual Wavelength Radar Facility.
Final rept.,
Eugene A. Mueller, and Griffith M. Morgan, Jr. Jun 74, 37p CR-130 NSF/RA/E-74-061

Descriptors: *Hail, *Thunderstorms, *Meteorological radar, Weather modification, Reflectivity, Statistical analysis, Colorado, Illinois.

A 2 1/2 year project involving operations and analysis of data from a unique dual wavelength radar system was devoted to study hailstorms. The effort focused in the use of the radar in the hail suppression project in Colorado and in general thunderstorm and hail studies in Illinois. The capabilities of this system are described along with research into statistical analyses of 10-cm reflectivity data and hail signals. Two radar-meteorological case studies of Colorado storms in 1973 are described.

5. BEHAVIORAL AND SOCIAL SCIENCES

5A. Administration and Management

AD-A011 730/9GA PC$5.75/MF$2.25
Prc Information Sciences Co Mclean Va
Experimental Interim RADC MIS System.
Final rept. 5 Mar 74-5 Mar 75,
Paul R. Soderholm. May 75, 132p RADC-TR-75-131
Contract F30602-74-C-0204

Descriptors: *Management information systems, *Computer programming, Time sharing, On line systems, Data management, Information retrieval, FORTRAN.
Identifiers: FEMIS system, Honeywell 600/6000 computers.

This report describes the FEMIS System which was designed by RADC as an experimental interim management system to automate various solutions to the Rome Air Development Center's management information support needs. The software operates under GCOS on the Honeywell 600/6000 series computers. The system executes in the time-sharing environment and has the flexibility to use CRTs and hard copy devices, as well as the high-speed off-line printer. The MIS is a data management retrieval tool, and can be used advantageously on fixed record length files.

AD-A012 350/5GA PC$4.25/MF$2.25
Assistant Secretary of Defense (Manpower and Reserve Affairs) Washington D C
The Unit Fund Concept and the All Volunteer Force (A Management Study).
Final rept.
May 75, 69p

Descriptors: *Military organizations, *All volunteer, *Finance, Department of Defense, Feasibility studies, Management planning and control, Methodology.
Identifiers: Nonappropriated funds, Morale, welfare, and recreation programs, Unit fund operations, All volunteer military services.

A management study is presented to determine the feasibility of strengthening the unit fund concept so as to have it more fully support the All Volunteer Force; it contains background and purposes of unit funds, provides key definitions and current unit fund support procedures used by the four Military Services; it presents management considerations for establishing unit funds, identifies authorized expenditures/prohibitions of each Service, discusses impact unit funds may have on the all volunteer force, and presents principal observations, conclusions and a recommendation.

AD-A012 419/8GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Comparing Inventory Demand Forecasts.
Technical rept.,
Peter W. Zehna, and Charles F. Taylor, Jr. May 75, 55p Rept no. NPS-55Ze75051

Descriptors: *Inventory control, Forecasting, Mathematical prediction, Standard deviation, Mean, Computations, Computerized simulation, Computer programs, FORTRAN.
Identifiers: Exponential smoothing, Maximum likelihood estimation, *Demand(Economics), FORTRAN 4 programming language.

Continued efforts to compare exponential smoothing with other alternatives to demand forecasting are summarized. Using stock-out risk at one extreme and oversupply at the other, the effects of variability in forecasting, even when accurate with respect to the mean, are highlighted. Using a normal model, exponential smoothing is identified as a major source of variability. Various forecast methods are compared using simulation relative to mean squared error when mean demand is allowed to vary according to specified patterns. In almost all circumstances, exponential smoothing consistently emerges as a first choice. The same alternatives are compared using real demand data and the results show exponential smoothing and maximum likelihood to be essentially equivalent.

COM-75-10920/7GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C.
Considerations in the Use of Sampling Plans for Effecting Compliance with Mandatory Safety Standards.
Final rept.,
V. L. Broussalian, A. J. Farrar, U. W. Lyons, C. O. Muehlhause, and M. G. Natrella. Jun 75, 59p* NBSIR-75-697

Descriptors: *Consumer products, *Product safety, *Standards, Federal policies, Regulations, Sampling, National government.
Identifiers: *Compliance testing.

Various means available to a regulator for gaining compliance with mandatory safety standards are examined. Particular attention is given to his option of mandating a sampling plan or scheme along with the standard. It is concluded that this option as well as the others identified are all viable under suitable conditions and should be available to the regulator for his possible application on a case by case basis.

PB-242 599/9GA PC$3.75/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Planning for the Effective Use of Computer-Based Information Systems in Local Governments.
Final rept.,
Ralph R. Young. Mar 74, 30p FXCO/ORS-75/8

Descriptors: *Local government, *Management information systems, *Urban planning, Computer applications, Technology utilization, Methodology, Virginia.
Identifiers: Municipal information systems, Alternatives, Fairfax County(Virginia).

The existence of a planning process for use of information technology in a large organization is discussed as a key factor in making effective use of a computer. The planning process for Fairfax County, Virginia, consists of conceptual approach utilized to take maximum advantage of information systems and computer-related resources. Alternative strategies to meet current challenges are reviewed. A methodology is provided to convert the ideas and plans of managers into systems development and hardware plans. Preparation of short and long-range plans is suggested as a means to evaluate and prioritize alternative information systems development opportunities.

PB-242 620/3GA PC$3.75/MF$2.25
Illinois Univ. at Urbana-Champaign. Center for Advanced Computation.
Energy Conservation Through Taxation.
Interim research rept.,
Clark W. Bullard. Jan 74, 31p UIUC-CAC-DN-74-95 NSF/RA/N-74-206
Grant NSF-GI-35179

Descriptors: *Tax structure, *Energy conservation, Energy consumption, Electric power, Petroleum products, Materials, Services, Mathematical models, Revenue, Tax base, Incentives, Economic impacts, Consumers, Consumer products.
Identifiers: Energy tax.

The growth of energy productivity has slowed in recent years. This trend implies that energy demands will rise at increasing rates if economic growth is sustained. In turn, environmental, fiscal, and national security problems associated with growing energy demands may increase faster than the ability to cope with them. To provide incentives for increasing energy productivity, an energy conservation tax is proposed. A linear model is used to estimate the impacts of such a tax is proposed. A linear model is used to estimate the impacts of such a tax on prices of final products. It is shown that an ad valorem tax could be more regressive than a specific tax based on energy units.

PB-242 628/6GA PC$17.50/MF$17.50
Hungarian Central Technical Library and Documentation Center, Budapest.
Economic Commission for Europe: Technological Information Systems and Services for Innovation.
1974, 450p
Proceeding and Documentation of the Seminar Convened by the United Nations Economic Commission for Europe held at Balatonfured (Hungary), on 2-6 October, 1973.

Descriptors: *Technology innovation, *Meetings, Europe, Information systems, Documentation, Industrial research and development, Technology utilization, Data processing, Economic development.
Identifiers: Commissions(Organizations), Information processing.

A report is made on the presentations of a 1973 seminar on technology innovations and information systems, held in Balatonfured, Hungary. The seminar was organized within the framework of the Economic Commission for Europe, dealing with the dissemination, types, cost, and use of information; systems and services for chemical, electrical, mechanical, and marine engineering; methods of interlinking and problem solving; and computerized operations.

PB-242 848/0GA PC$6.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1972, 1973, and 1974. Volume XXII, Appendixes C and D. Detailed Statistical Tables.
Final rept.
1973, 151p
See also PB-242 853.

Descriptors: *Research and development, *Federal financing programs, Statistical data, Classifications, Organizations, Basic research, Applied research, Development, Statewide summaries, Historical data, Foreign affiliates, Federal budgets, National government.
Identifiers: Agencies, Science fields.

These 121 detailed tables present compilations of data on R&D activities of Federal agencies for the 1972-74 budget period. They show research and development by agency, character of work, and performer. They show research by agency, performer, and field of science; basic research, applied research, and development by agency and performer; also foreign performers, R&D plant, and research and development by State distribution. Historical data are given back to 1964. R&D information activities are also covered.

PB-242 849/8GA PC$6.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Federal Funds for Research, Development and Other Scientific Activities, Fiscal Years

1973, 1974, and 1975. Volume XXIII, Detailed Statistical Tables. Appendices C and D.
Final rept.
1974, 168p NSF-74-320-A
See also PB-242 850.

Descriptors: *Research and development, *Federal financing programs, Statistical data, Classifications, Organizations, Basic research, Applied research, Development, Universities, Statewide statistics, Information systems, Foreign affiliates, National government.
Identifiers: Agencies, Science fields.

These 137 detailed tables present compilations of data on R&D activities of Federal agencies for the 1973-75 period. They show research and development by agency, character of work, and performer. They show research by agency, performer, and field of science; basic research, applied research, and development by agency and performer; also R&D plants. They give total research performed at universities and colleges by agency and field. They give data on foreign performers, State distribution, and historical data from 1965 to 1975. R&D information activities are also covered.

PB-242 850/6GA PC$4.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1973, 1974, and 1975. Volume XXIII.
Surveys of science resources series (Final).
1974, 75p NSF-74-320
See also PB-242 849.
Paper copy also available from GPO.

Descriptors: *Research and development, *Program review, *Federal financing programs, State programs, Federal budgets, Economic indicators, Basic research, Applied research, Geographic divisions, Statistical distributions, Scientific research, Technology development, Classifications, Organizations, Development, National government.
Identifiers: Agencies, Science fields.

This report covers R&D funding by agency, performing sector, character of work (basic research, applied research, and development), and field of science, as well as by state distribution for the 1973-75 budget period. Data are related to broader economic measures such as the overall Federal budget, gross national product, and foreign R&D/GNP ratios. R&D plant data are additionally given. A separate part of the report deals with scientific and technical information activities. Appendix tables are published separately.

PB-242 851/4GA PC$4.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Research and Development in State Government Agencies, Fiscal Years 1972 and 1973.
Final rept.
Feb 75, 74p NSF-75-303
Paper copy also available from GPO.

Descriptors: *Research and development, *State government, *Organizations, Technology utilization, Plant expenditures, Statistical data, Classifications, Financing, Information systems, Manpower.
Identifiers: Agencies.

This report is the third in a series presenting the results of surveys on R&D activities of state government agencies. Even though the amounts are relatively small, the surveys provide a data base for measurement of a growing area of R&D activity, one that is of increasing interest to those concerned with utilization of R&D results. In 1975 R&D and R&D plant expenditures of state government agencies were $273 million. Leading states were New York and California with 23 percent and 13 percent, of the total, respectively. Leading areas of R&D activity were health and natural resources with 35 percent and 22 percent of the total, respectively. Data are analyzed by functional area, source of funds, performer, and character of work. R&D manpower is covered. The leading 15 states are also analyzed individually.

PB-242 853/0GA PC$4.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Federal Funds for Research, Development, and Other Scientific Activities, Fiscal Years 1972, 1973, and 1974. Volume XXII.
Surveys of science resources series (Final).
1973, 72p NSF-74-300
Previously announced as N74-26418. See also PB-242 848.
Paper copy also available from GPO as Stock No. 3800-00174.

Descriptors: *Research and development, *Federal financing programs, Classifications, Organizations, Economic factors, Federal budgets, International comparison, Basic research, Applied research, Development, Statistical data, National government.
Identifiers: Agencies, Science fields.

This report is the 22nd in an annual series that measures the R&D activities of Federal agencies and analyzes them by major characteristics. It covers R&D funding by agency, performing sector, character of work (basic research, applied research, and development), and field of science, as well as by state distribution for the 1972-74 budget period. Data are related to broader economic measures such as the overall Federal budget, gross national product, and foreign R&D/GNP ratios. R&D plant data are additionally given. A separate part of the report deals with scientific and technical information activities. Appendix tables are published separately.

5B. Documentation and Information Technology

AD-A011 700/2GA PC$4.75/MF$2.25
Defense Documentation Center Alexandria Va
Delimited AD Document Index.
Jul 75, 83p Rept no. DDC/TR-75/5

Descriptors: *Indexes, *Military publications, *Reports, *Documents, Classification, Information retrieval, Classified materials.
Identifiers: Classified documents, *Delimited AD documents, Declassification, Technical reports.

This consolidated index, in AD number order, lists 31,450 technical reports originally accessioned by DDC as limited distribution and/or classified, but later released for public distribution and sale by NTIS (National Technical Information Service). The index covers the last 11 years of unclassified and 16 years of classified document input in the DDC collection.

AD-A012 145/9GA PC$10.00/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
List of Publications of the U.S. Army Engineer Waterways Experiment Station,
Virginia Dale. May 75, 365p

Descriptors: *Civil engineering, *Ordnance, *Army research, *Bibliographies, Concrete, Environmental protection, Civil engineering, Mathematical models, Earth fills, Construction materials, Mobility, Soils, Pavements, Explosives, Excavation, Hydraulic models, Model tests, Weapons effects.
Identifiers: Dredging, Dredge spoil, Aggregates, Frozen soils.

Publications issued through June 1974 by the U.S. Army Engineer Waterways Experiment Station are listed and indexed according to the key-word-out-of-context method. The publications are grouped according to the technical laboratories that prepared them; these laboratories are as follows: Concrete Laboratory, Environmental Effects Laboratory, Explosive Excavation Research Laboratory, Hydraulics Laboratory, Mobility and Environmental Systems Laboratory, Soils and Pavements Laboratory, Weapons Effects Laboratory.

AD-A012 232/5GA PC$4.25/MF$2.25
IBM Federal Systems Div Gaithersburg Md
Navy Technical Manual System Publishing Subsystem, Functional Objectives Definition.
Final rept.,
Charles F. Touchton, Henry J. Laue, and William G. Burke, Jr. 6 Jun 75, 58p Rept no. FSD-75-0118
Contract N00167-75-C-0036

Descriptors: *Information systems, *Naval planning, *Manuals, Technology, Documents, Information retrieval, Data storage systems, Classification, User needs, Computer applications, Information processing, Systems analysis, Naval operations.
Identifiers: *Technical manuals.

The Navy Technical Manual System (NTMS) is intended to support and improve the preparation, revision, storage, distribution, management and control of Navy technical manuals. This report presents a number of functional objectives for a component of this system, the NTMS Publishing Subsystem. These objectives relate to the TM products which the system is intended to support; the types of material anticipated for these products; a number of system processes which are expected to be associated with this material; and the organizations and users which are expected to interface with these processes.

AD-A012 340/6GA PC$8.75/MF$2.25
Ram2 Task Force (Army) Alexandria Va
Proposed Microform System for Administration of HQDA Military Personnel Records.
Final rept. 19 Mar 73-31 Jan 75,
Leonard S. Lee, Charles E. Dexter, and Robert D. Legg. Apr 75, 298p Rept no. 75-03

Descriptors: *Records, *Microfiche, *Data management, Methodology, Microform, Photomicrography, Army personnel, Data storage systems, Information retrieval, Maintenance, Management, Files(Records), Conversion, Cost analysis, Benefits, Flow charting.
Identifiers: *Records management, Personnel records, Micrographics, RAM2 project.

A need exists to improve administration and management of the HQDA paper copy official military personnel records system. RAM2 Task Force designed a proposed microform replacement, pilot tested it under operational conditions and found the concept to be acceptable. Based on test results modifications were made and a full scale implementation plan developed. This report describes the methodology of the study, its findings and results and provides detailed recommendations for implementation. (Author)

AD-A012 349/7GA PC$3.75/MF$2.25
Office of Naval Research London (England)
European Scientific Notes. Volume 29, Number 6,
Waldo G. Magnuson, Jr., and Victoria S. Hewitson. 30 Jun 75, 48p Rept no. ESN-29-6
See also Vol. 29, No. 5, AD-A010 524.

Descriptors: *Scientific research, *Europe, Reviews, Aerospace systems, Biology, Chemistry, Earth sciences, Engineering, Oceanography, Physics, Great Britain.

The monthly publication presents brief articles concerning recent developments in European Scientific research. It is hoped that these articles (which do not constitute part of the scientific literature) may prove of value to American scientists by disclosing interesting information well in advance of the usual scientific publications.

COM-75-10926/4GA PC$12.50/MF$2.25
National Bureau of Standards, Washington, D.C.
Publications of the National Bureau of Standards. 1974 Catalog. A Compilation of Abstracts and Key Word and Author Indexes.
Special pub.,
Betty L. Hurdle. Jun 75, 528p NBS-SP-305-Suppl-6
See also Rept. no. NBS-SP-305-Suppl-5 dated Jul 74, COM-74-50930. Paper copy also available from GPO as C13.10:305 Suppl. 6.

Descriptors: *Research, *Bibliographies, Abstracts, Periodicals, Indexes(Documentation), Authors, National government.
Identifiers: National Bureau of Standards, Author indexes.

This Supplement to Special Publication 305 Supplements 1 through 5 of the National Bureau of Standards lists the publications of the Bureau issued between January 1, 1974 and December 31, 1974. It includes an abstract of each publication (plus some earlier papers omitted from Special Publication 305 Supplement (4), key-word and author indexes; and general information and instructions about NBS publications.

N75-23804/8GA PC$4.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Selected Contributions to High-Speed Physics.
1974, 66p BMVG-FBWT-74-8
Subm-Sponsored by Bundesmin. Fuer Verteidigung.
In German; English Summaries.

Descriptors: *Ceramics, *Energy conversion, *Laser mode locking, *Pulsed lasers, Antiferroelectricity, Ferroelectricity, Laser outputs, Pulse duration, Transient response.

For abstract, see STAR 1315

PB-242 929/8GA PC$5.25/MF$2.25
Tufts Univ., Boston, Mass. School of Medicine.
A System for Management of Selected Data in Medical Rehabilitation. A Monograph,
Carl V. Granger. Apr 73, 104p SRS-16-56800-003
Contract SRS-16-56800

Descriptors: *Medical records, *Information systems, *Rehabilitation, *Data processing, Patients, Clinical medicine, Physical therapy, Occupational therapy, Data storage, Data retrieval.
Identifiers: Long term care.

The report states as its premise that the traditional system for constructing medical records is outmoded and fails to adequately serve the special needs of medical rehabilitation. The purposes of this project were to define a minimum comprehensive data base oriented toward present and potential clinical problems. This was accomplished by the development and use of programmed forms for the patient's medical history, the report of the physical examination, and the laboratory results. The data from these forms is coded, typed on magnetic tape, and stored in the computer for future access and analysis.

5C. Economics

AD-A012 086/5GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass
Equilibrium Consumption Schedule in a Simple Model of Economic Growth.
Technical rept.,
Elon Kohlberg. May 75, 22p Rept no. TR-18
Contract N00014-67-A-0298-0019
Report on Project on Efficiency of Decision Making in Economic Systems.

Descriptors: *Economic models, Equilibrium(General), Consumption, Theorems.
Identifiers: Growth models, Utility functions.

A consumption schedule is a rule that specifies an individual's consumption as a function of his endowment. A consumption schedule is an equilibrium if it is self enforcing; by this is meant that each individual, given that all other individuals abide by the rule, will find it to his own best interest to also abide by the rule. Here some properties of equilibrium consumption schedules in a simple model of economic growth are studied.

AD-A012 087/3GA PC$3.25/MF$2.25
Harvard Univ Cambridge Mass
Quantity Adjustments in Resource Allocation: A Statistical Interpretation.
Technical rept.,
Kenneth J. Arrow. Jun 75, 17p Rept no. TR-19
Contract N00014-67-A-0298-0019
Report on Project on Efficiency of Decision Making in Economic Systems.

Descriptors: *Economic models, *Decision theory, Allocations, Quantities, Computations, Theorems.
Identifiers: Successive approximations method, *Resource allocation.

One method of successive approximations to a constrained optimum maintains feasibility while adjusting the decision variables along the gradient of the Lagrangian. Then the adjustments can be found as the residuals in the regression of the partial derivatives of the objective function on the partial derivatives of the constraint functions. Implications for decentralization are discussed.

AD-A012 088/1GA PC$3.75/MF$2.25
Harvard Univ Cambridge Mass
A Non-Walrasian Model of a Market Economy.
Technical rept.,
Hiroaki Osana. Apr 75, 26p Rept no. TR-17
Contract N00014-67-A-0298-0019
Report on Project on Efficiency of Decision Making in Economic Systems.

Descriptors: *Economic models, Equilibrium(General), Allocations, Convex sets, Theorems.
Identifiers: *Exchange economies, *Prices, Monopolistic competition, Resource allocation, Walrasian model.

In the Walrasian model of a market economy, every agent is assumed to be a price-taker and hence there is no agent who can change prices. In the same model, it is also assumed that if the excess demand for some commodity is positive (resp. negative) the price of the commodity will rise (resp. fall unless the price is already zero). The latter assumption would require the presence of an agent to be called an auctioneer if the model were to be regarded as self-contained. This paper presents a tentative non-Walrasian formulation of a pure-exchange market economy in which not every agent is assumed to be a price-taker and no auctioneer is assumed to be present. An equilibrium concept is proposed and its static properties are discussed.

AD-A012 214/3GA PC-GPO
Department of the Army Washington D C
Scandinavia: A Bibliographic Survey of Literature.
30 May 75, 162p Rept no. DA-PAM-550-18
Library of Congress Catalog Card No. 74-14935.
Availability: Paper copy available from GPO.

Descriptors: *Norway, *Sweden, *Finland, *Iceland, *Denmark, *Handbooks, Economics, Political science, Sociology, NATO, International relations, Communism, Industries.
Identifiers: Area studies.

This unclassified bibliographic survey was prepared to fill the need for information on Scandinavia, a strategically important area of Europe, about which, generally speaking, there is considerable lack of current literature in the English language, suitable for inclusion in DA pamphlets. The materials delve into the military, political, economic, and sociological aspects from both friendly and unfriendly sources. No effort has been made to delete or exclude references by reason of their controversial nature.

AD-A012 309/1GA PC$4.75/MF$2.25
Rand Corp Santa Monica Calif
China's Approach to Technology Acquisition: Part I. The Aircraft Industry.
Interim rept.,
Hans Heymann, Jr. Feb 75, 87p Rept no. R-1573-ARPA
Contract DAHC15-73-C-0181

Descriptors: *Technology, *Aircraft industry, *China, Reviews.
Identifiers: Technological growth, Technological intelligence, Technology utilization, Technology transfer.

This is Part I of a three-part study to examine how effectively the People's Republic of China utilizes the great reservoir of technology that is potentially available to it from the most advanced industrial countries. The report deals with the Chinese aircraft industry. It traces the successive stages of the industry's evolution and delineates the foreign contribution to its technological growth. The study illuminates China's technology acquisition strategy: How that strategy evolved over the past twenty-odd years; how it is linked to the process of technology diffusion within China; and how China's present and future rate of high-technology advance is likely to depend upon outside contributions.

COM-75-50068/GA PC-GPO
Bureau of International Commerce, Washington, D.C.
Foreign Economic Trends and Their Implications for the United States.
1975,147 issues
Paper copy available from GPO on subscription from Bureau of International Commerce, Washington, D.C. $0.25/copy.

The series of reports presents current business and economic developments in every country that offers a present or potential market for United States goods. The reports include a summary of the prospective impact on the United States economy, changing trade patterns, prospective business trends, balance of payments, government policies, and investments. For individual country reports, order by COM-number listed below:

FET-75-069. Saudi Arabia. Semiannual rept. Jun 75, 8p, supersedes ET-75-007 **COM-75-50068-069/GA**
FET-75-071. Venezuela. Semiannual rept. Jun 75, 8p, supersedes ET 75-001 **COM-75-50068-071/GA**
FET-75-073. Paraguay. Annual rept. Jun 75, 8p, supersedes ET-74-067 **COM-75-50068-073/GA**

FET-75-074. Malagasy Republic. Annual rept. Jun 75, 8p, supersedes ET-74-075
COM-75-50068-074/GA

COM-75-50120/GA PC-GPO
Domestic and International Business Administration, Washington, D.C.
Overseas Business Report.
John M. Garner. 1975,approx. 70 issues
Paper copy available from GPO.

The reports present basic authoritative information for exporters, importers, investors, manufacturers, researchers, and those concerned with international trade and economic conditions. For individual reports, see below:
OBR-75-24. The Caribbean Community and Common Market: Their Implications for United States Business. Jun 75, 12p
COM-75-50120-24/GA
OBR-75-26. Marketing in Senegal. Jun 75, 16p **COM-75-50120-26/GA**
OBR-75-27. Marketing Factors in Burma. Jun 75, 12p **COM-75-50120-27/GA**

COM-75-50389/6GA
PC-GPO/MF$2.25-NTIS
Office of Minority Business Enterprise, Washington, D.C.
Franchise Opportunities Handbook. Ninth Edition,
Andrew Kostecka. Mar 75, 249p
Paper copy available from GPO.

Descriptors: *Franchising services, *Handbooks, *Minority owned enterprises, Organizations, Minority business, Licenses, Federal assistance programs, Small business, Automotive products, Clothing, Construction materials, Employment services, Hotels, Food, Restaurants.

This Handbook is published in support of the Department's overall program to assist in establishing minority group business, an effort which is spearheaded by the Office of Minority Business Enterprise. This publication identifies franchisers who do not discriminate on the basis of race, color, or national origin in the availability, terms, or conditions of their franchises. The listing of equal opportunity franchisers provides a brief summary of the terms, requirements, and conditions under which the franchises are available. The introductory section includes general information on franchising, suggestions and checklists to assist and protect the potential investor, leads to other sources of information, and an identification of both governmental and private organizations which can assist minority group entrepreneurs.

PB-242 216/0GA PC$4.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
A Regionalized Electricity Model.
Progress rept.,
Martin L. Baughman, and Paul L. Joskow. Dec 74, 60p MIT-EL-75-005 NSF/RA/N-74-203
Grant NSF-SIA73-07971-A02

Descriptors: *Electric utilities, Economic models, Electric power, Electric power generation, Electric power distribution, Electric power demand, Simulation, Regional planning.

An engineering-econometric simulation model is designed to provide a quantitative understanding of the effect of a wide range of variables on electricity supply, demand, and electricity costs. Geographically, the model consists of nine regions corresponding to the nine census regions of the U.S. The variables considered are electricity demand; the capital and operating costs of different types of generating plant; fuel prices; and the shape of load curves. A change in any of these items may affect most features of the future evolution of fuels consumption and costs within the industry. Future modifications of the initial model will allow investigation of the effects of sulfur restrictions, nuclear growth constraints, peak load pricing, capital constraints, and breeder reactor availability.

PB-242 326/7GA PC$7.00/MF$2.25
General Electric Co., Schenectady, N.Y. Technical Ventures Operation.
A Study of Severed Venture Mechanism for Technological Innovation and Its Broader Application to American Industry.
Final rept.,
D. J. Bendaniel. Dec 74, 198p* NSF/RA/R-74-063
Grant NSF-C815

Descriptors: *Venture research, *Technology innovation, *Industrial surveys, Small businesses, Venture capital, New technology, Management methods, Viability, Failure, Entrepreneurship, Byproducts, Industrial research and development.
Identifiers: New products, Spinoffs, Severed venture firms.

This report covers the history and development of several small technologically-based industries under a program entitled Technical Venture Operations (TVO), which was defined and is sponsored by the General Electric Company. The businesses cited in this report were based on technologies which had originated in a large corporation--GE--but were later developed as separate enterprises organized by GE and a founder. In each case, outside venture capital was obtained to finance the new enterprise. Based on this experience, the report analyzes alternative possibilities for the diffusion of this mechanism to other corporations.

PB-242 519/7GA PC$4.25/MF$2.25
Diebold Group, Inc., New York.
An Analysis of Factors Affecting Private Investment in New Products, Processes and Services. Executive Summary.
Final rept.,
John G. Rehak. Jun 73, 70p NSF/RA/R-73-003A, NSF/RDI-3
Grant NSF-C794
See also PB-242 520.

Descriptors: *Venture capital, *Investments, *New technology, Venture research, Investment guarantees, Regulations, Loans, Risk, Insurance, Investment incentives, Federal assistance programs, Subsidies, Return on investment.

The report discussed options to increase the investment of both conventional and unorganized venture capital in technologically based new ventures. The study included conflicting regulatory actions by the Federal Government which inhibit investment in high risk technology ventures in the analysis. The report concluded by spotlighting the potential of a loan guarantee or risk insurance incentive in the venture area for stimulating more investment in new high technology companies.

PB-242 520/5GA PC$5.75/MF$2.25
Diebold Group, Inc., New York.
An Analysis of Factors Affecting Private Investment in New Products, Processes and Services. Phase Two Report.
Final rept.
Oct 73, 144p NSF/RA/R-73-003B, NSF/RDI-3B
Grant NSF-C794
See also PB-242 519.

Descriptors: *Venture capital, *Investments, *New technology, Venture research, Investment guarantees, Regulations, Loans, Risk, Insurance, Investment incentives, Federal assistance programs, Subsidies, Return on investment.

This report is a follow-on to the previous report which concluded that federally sponsored risk coverage insurance against investment loss for new technology, high risk ventures might be a promising experimental area for the Experimental R and D Incentives Program (RDI). In this report, existing federal insurance programs were identified, detailed background information on them were developed and the acceptability reviewed of extending the insurance concept into the risk capital area. The report concluded that a program of limited guarantees of investments in new and improved technology oriented enterprises would substantially increase the amount of funds available for such investment with a corresponding impact on the technological growth of the nation.

PB-242 558/5GA PC$7.25/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Urban Studies and Planning.
A Guide for Users of the U.S. Multiregional Input-Output Model (Revised Version).
Rept. no. 2 (Revised),
Karen R. Polenske, Carolyn W. Anderson, and Mary M. Shirley. Mar 74, 225p*
Contract DOT-OS-10058
Supersedes PB-213 550.

Descriptors: *Input output models, *Multiregional models, Interindustry transactions, Trade flows, Economic analysis, FORTRAN, Regional economic activity.
Identifiers: DOT/4HZ/HC.

The purpose of the report is to provide a practical guide for users of the multiregional input-output (MIRO) data assembled at the Harvard Economic Research Project and the model implemented at the Massachusetts Institute of Technology using those data. In the first part, a general description of the multiregional accounting system is given. The second part contains a description of the basic data used to set up the multiregional model for the base year, 1963, and provides the detail and some of the rationale for the methods used to obtain the necessary consistencies, both internally within the MRIO accounts and externally with the national input-output figures. The third part is intended as a guide for the actual implementation of the multiregional input-output model.

PB-242 603/9GA PC$6.25/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Economic Impact Analysis.
Short-Term Microeconomic Impact of the Oil Embargo October 1973-March 1974,
Harold Weisman. Apr 75, 165p FEA/B-75/199

Descriptors: *Embargos, *Economic impacts, *Energy crisis, Shortages, Manufacturing, Construction, Utilities, Transportation, Services, Industrial outlook, Management planning, Economic prospects.
Identifiers: *Fuel shortages.

In the early stages of the 1973 oil embargo by the organization of Petroleum Exporting Countries, considerable alarm was expressed throughout industry and government regarding the economic disruptions that might result from shortages of petroleum products. A series of studies of major energy-using and energy sensitive industries was made to ascertain current patterns of energy usage, the spcific impacts of energy shortages, and the steps taken by industry to adjust to such shortages. The information is of value in assessing the ability of industries to adjust to shortages of petroleum products, and in tracing the impacts of energy shortages on the economic performance of industries. Information related to six sectors of the economy is provided in the report. These sectors are basic energy industries, manufacturing, construction, utilities, transportation, and services.

PB-242 720/1GA PC$3.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Energy Lab.
A User's Guide to the MIT Natural Gas Model,
Kevin R. Lloyd. Jun 75, 32p MIT-EL-75-011
NSF/RA/N-75-035
Grant NSF-GI-34936

Descriptors: *Natural gas, *Economic models, Computerized simulation, Prices, Growth, Economic forecasting.
Identifiers: TROLL system.

This report is a guide to assist individuals in the computer use of the MIT Natural Gas Model in an interactive time-sharing framework.

PB-242 738/3GA PC$3.75/MF$2.25
Illinois Univ. at Urbana-Champaign. Center for Advanced Computation.
Computational Techniques for Input-Output Econometric Models.
Interim research rept.,
Killion Noh, and Ahmed Sameh. Sep 74, 26p
UIUC-CAC-DN-74-134 NSF/RA/N-74-207
Contract NSF-GI-35179

Descriptors: *Economic models, Econometrics, Matrices(Mathematics), Computation, Computer programs.
Identifiers: Input output models.

In an input-output econometric model one is often concerned with solving the system of n equations (I - A) x = y, repeatedly for various changes in the elements of A. This system of equations expresses gross output requirements (x) as a function of final demand (y) and the technological structure of the economy (a); changes in the elements of A can come about for a variety of reasons. In this paper the authors present techniques for solving such large systems of equations, and for updating the solution to account for changes in A. The methods presented effect substantial savings in computing time and storage requirements over those conventionally employed.

PB-242 751/6GA PC$10.50/MF$2.25
Shriver (R.) Associates, Parsippany, N.J.
The Petroleum Industry: A Report on Corporate and Industry Structure and Ownership. Part 1,
John M. Iannone. 25 Apr 75, 405p* FEA/C-75/326-1
Contract FEA-C-03-50035-00
Paper copy also available in set of 2 reports as PB-242 750-SET, PC$20.50.

Descriptors: *Petroleum industry, *Economic surveys, Industrial surveys, Corporations, Ownership, Indexes(Documentation), Refining industries, Marketing, Production statistics, Pipelines, Uranium, Geothermal prospecting, Coal industry, Investments, Joint operations, Crude oil, Definitions, Data acquisition.
Identifiers: Subsidiaries, Affiliates.

This report lists some 1500 parent petroleum companies and over 8000 domestic and foreign subsidiaries, affiliates, and investments in refining, marketing, production, pipelines, uranium, geothermal, coal, and non-energy areas. It provides the equity share owned by the parent firms and identifies the principal business for each subsidiary, affiliate, and investment. For joint ventures in crude production and refining, it presents the parent's equity interest, plus a list of joint-venture partners and their investments. The basic list of oil companies and affiliates was verified, updated and expanded by the oil companies themselves--providing data for a substantial number of subsidiaries and affiliates not previously available.

PB-242 752/4GA PC$10.25/MF$2.25
Shriver (R.) Associates, Parsippany, N.J.
Petroleum Industry: A Report on Corporate and Industry Structure and Ownership. Part 2,
John M. Iannone. Apr 75, 380p* FEA/C-75/326-2
Contract FEA-C03-50035-00
Paper copy also available in set of 2 reports as PB-242 750-SET, PC$20.50.

Descriptors: *Petroleum industry, *Economic surveys, Indexes(Documentation), Data acquisition, Business organizations, Corporations, Industrial research and development, Production, Refining, Pipelines, Ownership.
Identifiers: Subsidiaries, Affiliates.

Volume two of a two volume report continues the listing of some 1500 parent petroleum companies and over 8000 domestic and foreign subsidiaries, affiliates, and investments in refining, marketing, production, pipelines, uranium, geothermal, coal, and non-energy areas. It provides the equity share owned by the parent firms and identifies the principal business for each subsidiary, affiliate, and investment. For joint ventures in crude production and refining, it presents the parent's equity interest, plus a list of joint-venture partners and their investments.

PB-242 946/2GA PC$4.25/MF$2.25
Infodyne Systems, Inc., Potomac, Md.
The Analysis of the Economic Environment for the Report to Congress on Petrochemicals, 1974-75,
Alexander Woroniak. Aug 74, 74p* FEA/B-75/175
Contract FEA-C-03-50057-00
Paper copy also available from GPO.

Descriptors: *Petroleum products, *Industrial surveys, *Economic analysis, Economic forecasting, *International trade, Plastics, Synthetic elastomers, Benzene, Toluene, Butadiene, Xylenes, Polyethylene, Balance of trade, Foreign exchange.
Identifiers: *Petrochemicals, *Embargoes, Energy crisis.

In September 1974, a report on petrochemicals analyzed the petrochemical industry's current supply/demand situation and the outlook through the end of calendar year 1975. In complement to the report, the Office of Economic Impact prepared an overall review of the general economic environment, both domestic and foreign, within which the industry will operate during the next 18 months. This review is subsequent to the analysis of the trends and levels of crude oil imports versus trends and levels of chemical and petrochemical exports and the impact on the U. S. balance of trade and balance of payments. The supplement is organized into three sections: domestic, foreign, and the U. S. balance of trade and balance of payments.

PB-242 988/4GA PC$4.75/MF$2.25
Federal Trade Commission, Washington, D.C. Bureau of Economics.
Quarterly Financial Report for Manufacturing, Mining and Trade Corporations, 1974 (4th).
Apr 75, 94p FTC-QFR-1974
See also Apr 74, PB-237 158. Library of Congress Catalog Card no. 49-45545.
Paper copy also available from GPO.

Descriptors: *Manufacturers, *Industrial surveys, *Corporations, Quarterly indexes, Income, Earnings, Profits, Financial statements, Statistical data, Operations, Classifications, Assets, Mining industries, Trade, Liabilities.
Identifiers: Quarterly summaries.

The report presents for each calendar quarter composite statements of income and retained earnings, balance sheets, rates of return (profit rates), and related financial and operating statistics for all manufacturing corporations, classified by industry and asset size. The published results of this survey are designed to meet the needs of user agencies in the Executive and Legislative branches of the Federal Government; they are also used by non-government subscribers.

5D. History, Law, and Political Science

AD-A011 913/1GA PC$3.75/MF$2.25
University of Southern California Los Angeles Dept of International Relations
Crisis and Threat in the International Setting: Some Relational Concepts.
Technical interim rept.,
Charles A. McClelland. Jun 75, 49p Rept no. TR/A-TR-28
Contract N00014-67-A-0269-0029, ARPA Order-2518
Report on Threat Recognition and Analysis Project.

Descriptors: *International relations, Tension, Threats, National defense, Security.
Identifiers: World politics, Crisis situations.

The report summarizes recent research and theory on international political/military crises in world politics. Advances new concepts on the relationship between the theory of threat to national security and the theory of severe crisis responses. Outlines an approach to empirical research based on the threat-crisis conceptualization.

AD-A012 079/0GA PC$8.50/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
Ocean, Technology, Law.
1 May 75, 257p Rept no. NISC-Trans-3664
Trans. of mono. Okean, Tekhnika, Pravo, Moscow, 1972.

Descriptors: *Oceans, *Law, International law, Straits, Canals, Waterways, Continental shelves, Ocean bottom, North Sea, Preservation, Legislation, Regulations, Pollution, Fisheries, Natural resources, Protection, Translations, Baltic Sea, USSR.
Identifiers: Law of the sea, Territorial seas, Three mile limit.

Contents:
- Legal problems of international straits, canals and historic waters;
- Legal problems of the territorial sea, the continental shelf and the seabed;
- International legal protection of the world ocean from pollution and the preservation of living resources.

AD-A012 220/0GA PC$4.25/MF$2.25
Stanford Research Inst Arlington Va Strategic Studies Center
The Maintenance of U.S. Forces in Korea.
Final technical note,
William M. Carpenter, Young C. Kim, W. G. Dolvin, Stephen P. Gibert, and Harold C. Hinton. Jun 75, 66p Rept no. SSC-TN-3115-10
Contract DAAG39-74-C-0082
See also supplementary rept., AD-A012 224.

Descriptors: *Military Forces(United States), *South Korea, Political science, Military strategy, Japan, China, USSR, Foreign policy.

The study examines the question on whether the United States should maintain its military presence in South Korea or withdraw these forces, either in part or completely. Special emphasis is given to the question of retention of the U.S. ground forces. The analysis is made in terms of the perceptions of allies and potential adversaries of the United States regarding the role of the U.S. forces in maintaining Kore-

an and regional stability. Following analysis of the impact of retention or withdrawal, consideration is given to those circumstances under which it might be possible that these forces could be significantly reduced or withdrawn without adverse political or military repercussions.

AD-A012 224/2GA PC$5.75/MF$2.25
Stanford Research Inst Arlington Va Strategic Studies Center
The Maintenance of U.S. Forces in Korea: Background Study.
Final technical note,
Harold C. Hinton, Young C. Kim, Peter A. Poole, and Arthur A. Zuehlke, Jr. Jun 75, 144p Rept no. SSC-TN-3115-11
Contract DAAG39-74-C-0082
Supplement to AD-A012 220.

Descriptors: *Military Forces(United States), *South Korea, Political science, Military strategy.

This volume contains a collection of background papers on subjects pertinent to the question of whether to leave in place or withdraw part or all of the U.S. forces in Korea.

AD-A012 227/5GA PC$3.25/MF$2.25
Army War Coll Strategic Studies Inst Carlisle Barracks Pa
Detente and South Asia.
Military issues research memo.,
Archer K. Blood. 30 Jun 75, 25p

Descriptors: *Political science, *South Asia, Government(Foreign), United States government, Agreements, India, Pakistan, Foreign policy, China, USSR.
Identifiers: Detente.

AD-A012 228/3GA PC$3.75/MF$2.25
Army War Coll Strategic Studies Inst Carlisle Barracks Pa
The Spaceship and the Lifeboat: Metaphors for the 1990's. Detente as Future History.
Military issues research memo.,
John G. Thompson, and James E. Trinnaman. 6 Jun 75, 31p

Descriptors: *Political science, Government(Foreign), USSR, United States government, Power, Tension, Stability, International relations, Relaxation.
Identifiers: Detente, World politics.

The paper seeks to order the central trends and forces acting on detente into the 1990's. Viewing the future as history, two metaphorical constructs--the spaceship and the lifeboat--are developed within whose contrasting perspectives will be played out the main drama of detente and whose creative tensions will largely determine its course into the 1990's.

COM-75-10899/3GA PC$3.25/MF$2.25
Virginia Inst. of Marine Science, Gloucester Point.
Legal Symposium on Wetlands: An Executive Summary,
Roger D. Anderson, David Garten, and Ted Smolen. Nov 74, 11p NOAA-75061102
Grants NOAA-04-3-158-49, NOAA-04-5-158-5
Report on Coastal Zone Management in Virginia.

Descriptors: *Water law, *Coastal zone management, *Meetings, Shore protection, Legislation, Swamps, Estuaries, Water resources, Fisheries, Conservation, Law enforcement.
Identifiers: Sea Grant program.

The Virginia Institute of Marine Science sponsored a Wetlands Symposium for Members of the Bench and Bar on September 5, 1974 at the Institute. Workshop speakers commented on the legislative intent of the Virginia Wetlands Act (Title 62.1, Chapter 2.1, Code of Virginia 1950, effective July 1972) its impact to date, the taking issue, wetlands activities in other states, values and uses of marshes, the attitudes of industry and the enforcement issue. This report presents a summary of the proceedings.

5E. Human Factors Engineering

AD-A012 154/1GA PC$5.25/MF$2.25
Logicon Inc San Diego Calif
Human Engineering Requirements Manual for Evolving Systems (HERMES). Volume I.
Jun 74, 120p
Contract N62269-71-C-0348
See also Volume 2, AD-A012 155.

Descriptors: *Human factors engineering, *Systems engineering, *Weapon systems, *Naval planning, Manuals, Systems management, Air defense, Naval aircraft, Naval procurement, Systems analysis, Cockpits, Bioengineering.
Identifiers: *HERMES(Human Engineering Requirements Manual for Evolving Systems), *Human engineering requirements manual for evolving systems.

The importance of achieving an effective integration of the human operator/maintainer into the system during the system development process has increased with system sophistication and with the adoption of systems engineering as the accepted approach to system design. The shortage of qualified human factors engineers has led to the preparation of this specialized guide for the 'Program Coordinator for Human Factors Engineering'. The goal is to assist him in the management and evaluation of the contractor and in-house effort, as well as in the advice and assistances to the Program Manager. The manual consists of three parts. The first part, Volume I, is directed to a detailed review of the Navy Air Weapon Systems development process. Volume II is directed to a detailed review of specific human factors engineers' tasks in relation to the total air systems development process. Volume II contains basic reference instructions.

AD-A012 155/8GA PC$7.00/MF$2.25
Logicon Inc San Diego Calif
Human Engineering Requirements Manual for Evolving Systems (HERMES). Volume II.
Jun 74, 187p
Contract N62269-71-C-0348
See also Volume 1, AD-A012 154.

Descriptors: *Human factors engineering, *Systems engineering, *Weapon systems, *Naval planning, Manuals, Systems management, Air defense, Naval aircraft, Naval procurement, Systems analysis, Cockpits, Bioengineering.
Identifiers: *HERMES(Human Engineering Requirements Manual for Evolving Systems), *Human engineering requirements manual for evolving systems.

The Human Engineering Requirements Manual for Evolving Systems (HERMES) was conceived as a guide to the implementation and management of HFE development requirements in major Naval Air Systems Command (NAVAIRSYSCOM) Weapon System projects. It identifies major events and the coordination and interface requirements associated with the system design and development process. It also specifies inputs and outputs required in terms of purpose and function to meet the HFE objective of a totally integrated man-machine system.

AD-A012 174/9GA PC$4.25/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
A Simulation of the Human Shoulder.
Technical memo (Final),
Richard R. Kramer. May 75, 56p Rept no. HEL-TM-15-75

Descriptors: *Rocket launchers, *Man machine systems, *Firing mechanisms(Weapon), Mathematical models, Human body, Human factors engineering, Simulation, Weapons, Recoil, Performance(Engineering), Tables(Data), Anatomy.
Identifiers: *Shoulders, *Recoil mechanisms.

A method is presented for estimating the recoil force at the interface between the firer's shoulder and his weapon. The method involves simultaneous second order differential equations, whose coefficients have been determined by empirical fits. An example is given, which shows how the initial pitch-up and the recoil forces of a rocket launcher can be estimated.

N75-24363/4GA PC$3.75/MF$2.25
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Behavioural Sciences Div.
Aerodrome Air Traffic Control in the Canadian Forces.
L. G. Innes. Nov 74, 29p DCIEM-74-R-1067

Descriptors: *Air traffic control, *Display devices, *Human factors engineering, *Visual observation, Communication equipment, Human performance, Information management, Man machine systems, Towers.

For abstract, see STAR 1315

N75-24364/2GA PC$3.25/MF$2.25
Technische Hogeschool, Delft (Netherlands). Man-Machine Systems Group.
The Lightspot Operated Typewriter: The Evaluation of a Prototype.
H. G. Stassen, M. Soede, and W. J. Luitse. Nov 74, 22p WTHD-65

Descriptors: *Automatic typewriters, *Handicaps, *Mental performance, Human factors engineering, Performance tests, Product development.

For abstract, see STAR 1315

5G. Linguistics

AD-A011 715/0GA PC$7.25/MF$2.25
California Univ Berkeley
Chinese-English Machine Translation System.
Final technical rept. 1 Sep 72-31 Aug 74,
William S-Y Wang, and Stephen W. Chan. Apr 75, 219p RADC-TR-75-109
Contract F30602-73-C-0119
See also AD-776 813.

Descriptors: *Machine translation, *Chinese language, *English language, *Computational linguistics, Computer programming, Dictionaries, Syntax, Grammars, Lexicography.
Identifiers: QUINCE system.

The report documents results of a 2 year R and D effort directed at the completion of a prototype system for Chinese-English machine translation of literature. The system, designated QUINCE, accepts Chinese input exactly as printed, with no pre-editing of any kind, and produces English output on experimental basis. Coding of Chinese text via Chinese teleprinter System (Model 600D) and subsequent conversion to Standard Telegraphic Code for a direct input to the computer have been successfully completed. Manual keypunching and coding have been completely eliminated.

5H. Man-Machine Relations

N75-24359/2GA PC$3.75/MF$2.25
Essex Corp., Alexandria, Va.
Development and Validation of Methods for Man-Made Machine Interface Evaluation.
Final Report.
T. B. Malone, and A. Micocci. Mar 75, 35p
NASA-CR-142824
Contract NASW-2747

Descriptors: *Man machine systems, *Space shuttle orbiters, Display devices, Human factors engineering, Manual control, Operations research, Physical factors, Work capacity.

For abstract, see STAR 1315

5I. Personnel Selection, Training, and Evaluation

AD-A011 752/3GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Prediction of SCUBA Training Performance.
Robert J. Biersner, and David H. Ryman. 27 Aug 73, 5p Rept no. 73-54
Availability: Pub. in Jnl. of Applied Psychology, v59 n4 p519-521 1974.

Descriptors: *Scuba divers, *Mathematical prediction, *Performance(Human), *Naval training, Selection, Underwater, Hazards, Work, Attitudes(Psychology), Reprints.
Identifiers: Hazardous occupation.

The predictive relationship of demographic, health and attitude measures with success in U.S. Navy SCUBA training was investigated. A multiple regression equation consisting of two health scales, two attitude scales and three demographic items was significantly associated with the pass-fail criterion on a validation sample, and was also significantly related to training success in a cross-validation sample. Those scales dealing with general mental health and concern about training were the most significant and reliable predictors of training success. These findings emphasize the importance of perceived health and attitudes in predicting the performance of those involved in training for extremely hazardous occupations.

AD-A011 819/0GA PC$6.25/MF$2.25
Naval Training Equipment Center Orlando Fla
Holographic Heads-Up Display for Naval Aviation Training.
Final rept. Jul 72-Dec 74,
Alfred H. Rodemann, Denis R. Breglia, and Windell N. Mohon. May 75, 165p Rept no. NAVTRAEQUIPC-IH-229

Descriptors: *Naval training, *Naval aviation, *Holography, Display systems, Head up displays, Technology, Transfer, Flight simulators, Theory, Systems engineering, Computer applications, Chemical properties, Lenses, Optical properties, Performance tests, Optical images.

This report summarizes the results of an effort to apply the technology of high efficiency holographic lens design and fabrication to the specific case of a heads-up display system for use in visual simulators for aviation training. Design methods are developed. Materials research is described. Holographic lens elements are evaluated.

AD-A011 846/3GA PC$4.75/MF$2.25
Honeywell Inc Minneapolis Minn Systems and Research Center
The Feasibility of Generalized Acoustic Sensor Operator Training.
Final rept. Feb 74-Feb 75,
Richard W. Daniels, and David G. Alden. May 75, 79p NAVTRAEQUIPC-74-C-0067-1
Contract N61339-74-C-0067

Descriptors: *Sonar operators, *Acoustic warfare, *Naval training, Training devices, Feasibility studies, Cost effectiveness, Simulation, Data bases, Job analysis, Requirements, Skills, Signal processing, Visual acuity, Auditory acuity, Performance(Human).
Identifiers: Generalized training, Curricula, Recommendations, Task commonality.

This program explored the feasibility of a generalized approach to acoustic sensor operator training and resulted in recommendations concerning implementation. The program involved the analysis of the task, skill, and knowledge requirements for acoustic sensor operators (ASO) across a representative sample of sensor systems.

AD-A011 986/7GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Simulating Maintenance Manning for New Weapon Systems. Volume I. Maintenance Manpower Management During Weapon System Development.
Final rept. 1 May 71-31 Oct 74,
Frank A. Maher, and Michael L. York. Dec 74, 34p Rept no. AFHRL-TR-74-97(I)
See also Volume 2, AD-A011 987.

Descriptors: *Maintenance personnel, *Maintenance management, *Weapon systems, *Logistics planning, *Computerized simulation, Air Force planning, Air Force procurement, Military aircraft, Attack bombers, Trade off analyses, Predictions, Estimates, Manpower, Requirements, Central processing units, Factor analysis, Air Force Systems Command, Logistics support, Management information systems.
Identifiers: Life cycle costing, *Logistics management, A-10 aircraft, CDC 6600 computers, LCOM computer program.

There is a need for a more responsive method for predicting maintenance manpower requirements for aircraft systems during development. This method should provide early estimates for use in trade offs and evaluations, and should be sensitive to the ways in which the new aircraft will be employed. A maintenance manpower simulation model was developed. In using the model, early estimates of maintenance task data for the new aircraft are based on Air Force experience with comparable subsystems and equipment on existing aircraft, factored for the new design and environment. These data are meshed with a detailed operations scenario and support concept assumptions in a model run on the Logistics Composite Model (LCOM) simulation program. The simulation output is iterated and analyzed in post-processor programs whose final output is a complete basic manning authorization document. This approach was evaluated by applying it to the A-10 Weapon System. The entire effort is reported in a five volume technical report.

AD-A011 987/5GA PC$5.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Simulating Maintenance Manning for New Weapon Systems. Volume II. Building and Operating a Simulation Model.
Final rept. Jul 71-May 74,
Donald C. Tetmeyer, and William D. Moody. Dec 74, 139p Rept no. AFHRL-TR-74-97(II)
See also Volume 1, AD-A011 986 and Volume 3, AD-A011 988.

Descriptors: *Maintenance personnel, *Maintenance management, *Weapon systems, *Logistics planning, *Computerized simulation, Air Force planning, Air Force procurement, Military aircraft, Attack bombers, Trade off analyses, Predictions, Estimates, Manpower, Requirements, Central processing units, Factor analysis, Air Force Systems Command, Logistics support, Management information systems.
Identifiers: Life cycle costing, *Logistics management, A-10 aircraft, CDC 6600 computers, LCOM computer program.

This report is the second of five volumes describing a new method for determining the maintenance manpower requirements of new aircraft. This volume provides a detailed description of the procedures for using the Logistics Composite Model (LCOM) to determine maintenance manpower required for a new weapon system. It is intended to service as a manual of instruction and methodological source document.

AD-A011 988/3GA PC$8.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Simulating Maintenance Manning for New Weapon Systems. Volume III. Maintenance Data Analysis Programs.
Final rept. 1 Jul 71-1 May 74,
Donald C. Tetmeyer, and Sharon R. Nichols.
Dec 74, 298p Rept no. AFHRL-TR-74-97(III)
See also Volume 2, AD-A011 987 and Volume 4, AD-A011 989.

Descriptors: *Maintenance personnel, *Maintenance management, *Weapon systems, *Logistics planning, *Computerized simulation, Air Force planning, Air Force procurement, Military aircraft, Attack bombers, Trade off analyses, Predictions, Estimates, Manpower, Requirements, Central processing units, Factor analysis, Air Force Systems Command, Logistics support, Management information systems, Data processing, Computer programs.

Contents:
Data selection and processing;
Data outputs;
Running the programs;
Hints for the programmer;
Data reliability.

AD-A011 989/1GA PC$3.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Simulating Maintenance Manning for New Weapon Systems. Volume IV. Data Base Management Programs.
Final rept. Jan 72-Apr 74,
Verlesta B. Hicks, and Donald C. Tetmeyer. Dec 74, 50p Rept no. AFHRL-TR-74-97(IV)
See also Volume 3, AD-A011 988 and Volume 5, AD-A011 990.

Descriptors: *Maintenance personnel, *Maintenance management, *Weapon systems, *Logistics planning, *Computerized simulation, Air Force planning, Air Force procurement, Military aircraft, Attack bombers, Trade off analyses, Predictions, Estimates, Manpower, Requirements, Central processing units, Factor analysis, Air Force Systems Command, Logistics support, Management information systems, Computer programs.
Identifiers: Life cycle costing, *Logistics management, A-10 aircraft, LCOM computer program, CDC 6600 computers.

This report is the fourth of five volumes describing a new method for determining the maintenance manpower requirements of new aircraft.

AD-A011 990/9GA PC$4.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
Simulating Maintenance Manning for New Weapon Systems: Volume V. Manpower Programs.
Final rept. Jul 72-Apr 74,
William D. Moody, Donald C. Tetmeyer, and Sharon R. Nichols. Dec 74, 84p Rept no. AFHRL-TR-74-97(V)

See also Volume 4, AD-A011 989.

Descriptors: *Maintenance personnel, *Maintenance management, *Weapon systems, *Logistics planning, *Computerized simulation, Air Force planning, Air Force procurement, Military aircraft, Attack bombers, Trade off analyses, Predictions, Estimates, Manpower, Requirements, Central processing units, Factor analysis, Air Force Systems Command, Logistics support, Management information systems.
Identifiers: Life cycle costing, *Logistics management, A-10 aircraft, CDC 6600 computers, LCOM computer program.

This report is the fifth of five volumes describing a new method for determining the maintenance manpower requirements of new aircraft.

AD-A012 243/2GA PC$4.25/MF$2.25
Air Force Occupational Measurement Center Lackland AFB Tex
Management Analysis Specialist Career Ladder AFSCs 69130, 69150, 69170, and 69190.
Occupational survey rept. Sep 73-Dec 74.
30 Jun 75, 52p Rept no. AFPT-90-691-157

Descriptors: *Job analysis, *Air Force personnel, Specialists, Skills, Management, Personnel development, Careers, Enlisted personnel, Manpower, Data processing.
Identifiers: Management analysis.

This report describes an occupational survey of the Management Analysis Specialist career ladder, AFS 691X0, conducted by the Occupational Survey Branch. The report describes the development of the survey instrument, its administration to job incumbents, and resulting summaries of tasks performed by airmen grouped by skill level, experience level, and similarity of tasks performed. Results are compared to current training and career field structure documents and recommendations for further study are presented.

AD-A012 247/3GA PC$4.75/MF$2.25
Air Force Human Resources Lab Brooks AFB Tex
T-4G Methodology: Undergraduate Pilot Training T-37 Phase.
Technical rept. Jul 73-May 74,
Robert R. Woodruff, J. T. Mullen, III, and James R. Winans. Dec 74, 77p Rept no. AFHRL-TR-74-107

Descriptors: *Flight training, *Flight simulators, *Jet training planes, Teaching methods, Flight instruments, Pilots, Instrument flight, Instructors, Courses(Education), Trainees, Cost effectiveness, Scheduling.
Identifiers: Undergraduate pilot training, T-37 aircraft, *T-4G flight simulators.

Results of an earlier study indicated that revised instructional methodologies could be used to save a significant number of T-37 aircraft hours when applied to the instrument training phase of Undergraduate Pilot Training (UPT). To determine the operational feasibility of adopting these methodologies command-wide, the 82d Flying Training Wing, Williams Air Force Base, Arizona, in consultation with AFHRL, Flying Training Division personnel, trained a total UPT class using the revised procedures. This report summarizes the methods used in the T-37 phase of the project and includes a copy of the revised syllabus, the Air Training Command prepared evaluation report, and associated schedules and flow charts. The potential savings demonstrated in this study averaged 42% (8.8 T-37 hours) per student for the instrument training phase and it is recommended that favorable consideration be given to command-wide application.

AD-A012 272/1GA PC$7.00/MF$2.25
Human Resources Research Organization Alexandria Va
A Program of Army Functional Job Reading Training: Development Implementation, and Delivery Systems.
Final rept.,
Thomas G. Sticht. Jun 75, 180p Rept no. HumRRO-FR-WD(CA)-75-7
Contract DAHC19-73-C-0004

Descriptors: *Reading, *Army training, *Personnel development, Job training, Literacy, Military requirements, Individualized training, Performance tests, Feasibility studies, Deficiencies, Skills, Performance(Human).
Identifiers: FLIT(Functional LITeracy), Functional literacy, Job reading training.

The report describes the development of an experimental program of job reading training designed to provide a level of functional literacy appropriate to minimal job task reading requirements in 6 major MOS career clusters. Program effectiveness for both general and job reading training is described in data based on the reading performance of some 3000 adult students at the 6 Army training centers at which the program was implemented. Reading training performance was measured by both a standardized test of general reading comprehension and an experimental measure of the job reading task skills required to learn and to perform a job.

AD-A012 315/8GA PC$4.25/MF$2.25
George Washington Univ Alexandria Va Human Resources Research Office
An Evaluation of Driver Simulators for Safety Training,
A. James McKnight, and Harold G. Hunter. Apr 65, 66p Rept no. HUMRRO exploratory study-20
Contract DA-44-188-ARO-2

Descriptors: *Training devices, *Simulators, *Drivers(Personnel), Safety, Education, Military personnel, Programmed instruction, Motion pictures, Effectiveness, Surveys.

The effectiveness of simulators in improving driver safety was evaluated in a 20-hour Driver Safety Education Course administered to 193 experienced drivers in Fort Lewis, Washington. Approximately half of the drivers received a program utilizing a motion picture type trainer and half used conventional media. Conclusions were (a) Programmed motion picture simulators are slightly superior to conventional methods in developing those knowledges and habits emphasized in their programs; (b) differences favoring the simulator are not likely to have sufficient impact to warrant a full-scale research program to determine their effectiveness in the long-term reduction of accidents and violations; and (c) simulators represent a promising approach to the development of safe driving knowledges, skills, and habits.

AD-A012 319/0GA PC$4.25/MF$2.25
Navy Personnel Research and Development Center San Diego Calif
Racial Differences in the Prediction of Class 'A' School Grades.
Final rept. 1 Jan 71-31 Dec 72,
Patricia J. Thomas. Jun 75, 54p Rept no. NPRDC-TR-75-39
See also report dated Jun 74, AD-784 141.

Descriptors: *Naval training, *Test construction(Psychology), *Personnel selection, *Ethnic groups, Technicians, Validation, Regression analysis, Negroes, Comparison, Caucasians, Mathematical prediction, Aptitudes, Schools.
Identifiers: Disadvantaged groups, Racial differences, Final school grades.

This study is the latest in a series of efforts to provide the educationally disadvantaged with an opportunity for technical training in a Navy rating. Based on the findings of a 1972 study, which concluded that the Navy's selection tests are not as valid for minority personnel as they are for the majority group, the utility of alternative test composites was investigated.

AD-A012 336/4GA PC$3.75/MF$2.25
Naval Air Development Center Warminster Pa Crew Systems Dept
Evaluation of the EC II Programmable Maintenance Simulator in T-2C Organizational Maintenance Training.
Final rept.,
Joann Wright, and Jane Campbell. 15 May 75, 39p Rept no. NADC-75083-40

Descriptors: *Training devices, *Maintenance, Teaching methods, Assessment, Simulators, Programmed instruction, Computer programs, Maintenance personnel, Hydraulic equipment, Flight control systems.
Identifiers: EC-2 training devices.

An evaluation was conducted of the EC II training device, a computerized programmable simulator, used in three system courses of the T-2C Organizational Maintenance Training Program: the hydraulics and flight controls course, the environmental (utility) system course and the power plants and related systems course. The findings indicate that the simulator proved at least an equally effective training aid as the conventional hardware units when used to teach general maintenance procedures.

AD-A012 396/8GA PC$3.75/MF$2.25
Stanford Univ Calif Graduate School of Business
A Scale for High Earners.
Technical rept.,
Thomas W. Harrell, and Margaret S. Harrell. 7 Jul 75, 29p Rept no. TR-7
Contract N00014-67-A-0112-0073

Descriptors: *Personnel development, *Industrial personnel, *Salaries, Surveys, Careers, Personnel selection, Economics, Analysis of variance, Ratings, Test construction(Psychology), Aptitudes, Males, Caucasians, Statistical processes.
Identifiers: Wage surveys, MBA degrees, Managers.

A scale has been developed for high versus low earning personnel with MBA degrees based on item analysis. The earnings criterion was self-reported earnings at five years out of school. In the combined classes of 1962, 1963, 1964, and 1965, those in the highest third of the class in earnings were contrasted with those in the bottom third. Men in the middle third were omitted from this analysis. Item analyses were made of the items from the Strong Vocational Interest Blank, Guilford-Zimmerman Temperament Survey, Individual Background Survey and Ghiselli's Self-Description Inventory. N was 390.

AD-A012 403/2GA PC$3.75/MF$2.25
George Washington Univ Washington D C Graduate School of Arts and Sciences
Toward the Development of a Navy-Census Occupational Dictionary.
Scientific rept.,
Irene Kyriakopoulos. 28 Mar 75, 38p Rept no. TR-1247
Contract N00014-67-A-0214

Descriptors: *Jobs, *Naval personnel, *Civilian personnel, Classification, Manpower utilization, Census, Job analysis, Comparison.
Identifiers: *Military occupations, *Civilian occupations.

The Census and Navy occupational classification systems are outlined and examined for the purpose of identifying the civilian occupations

which correspond to each Navy rating. The procedure for and problems encountered in matching occupations in each of these systems are described. The results of the matching are presented in the form of a Navy-Census cross-reference dictionary, to be used in forthcoming analyses involving Navy and civilian manpower problems.

AD-A012 404/0GA PC$6.25/MF$2.25
B-K Dynamics Inc Rockville Md
Utility Theory and Optimization in Military Personnel Management.
Technical rept. Feb 74-Oct 74,
John R. Schmid, and Richard K. Hovey. 15 Jan 75, 162p Rept no. BKD-TR-3-138
Contract N00014-72-C-0526

Descriptors: *Personnel management, *Enlisted personnel, *Naval planning, Optimization, Manpower utilization, Operations research, Mathematical models, Computer applications, Cost analysis, Reenlistment, Management planning and control, Skills, Salaries, Classification, Computer graphics.
Identifiers: Utility theory.

Computer-based optimization methodology was developed for the purpose of defining long range management goals for each major Navy personnel skill category. These goals are defined in terms of objective optimum force distributions by skill grouping, by length of service and by paygrade. Function evaluation involves the use of four major models: per capita cost, stable strength, utility, and reenlistment elasticity models. Descriptions and examples, the concept of personnel utility, and the overall optimization methodology are presented.

AD-A012 415/6GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
A Computer Solution to the Daily Flight Schedule Problem.
Master's thesis,
Craig Gibson Honour. Jun 75, 74p

Descriptors: *Flight training, *Squadrons, *Scheduling, Computer programming, Mathematical models, Algorithms, Graphics, Theses, Naval aviation, Personnel management.

A computer procedure to solve interactively the daily flight scheduling problem for training squadrons is proposed. The scheduling problem for a prototype squadron, Fighter Squadron One Hundred Twenty-one, is mathematically analyzed using graph coloring techniques. A procedure similar to published class scheduling solutions which uses an assignment algorithm is formulated. A computer program is then developed to demonstrate the procedure.

AD-A012 420/6GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
Systems Analysis and the Dynamics of Manpower.
Technical rept.,
Carson K. Eoyang. Jun 75, 26p Rept no. NPS-55Eg75061

Descriptors: *Personnel management, *Corporations, *Manpower utilization, Industrial personnel, Labor, Behavioral science, Forecasting, Mathematical models, Simulation, Systems analysis, Time lag theory, Dynamics.
Identifiers: Demand(Economics).

A behavioral model of manpower decision making is developed and exercised. The simulation incorporates a statement of Parkinson's Law which claims that the demand for labor is partially dependent upon the number of employees already on board. Additional features include exponential forecasting and variable delays in hiring and firing. A central feature of the model is the existence of organizational slack which is defined as the number of people in excess of what is necessary to satisfy market demands. Various sensitivity analyses are conducted and the Model's implications are discussed.

COM-75-10845/6GA PC$3.75/MF$2.25
Louisiana State Univ., Baton Rouge. Center for Wetlands Resources.
Marine Research Interest in Louisiana Universities, 1975.
1975, 35p LSU-SG-75-02 NOAA-75053002
Prepared in cooperation with Louisiana State Univ., Baton Rouge. Office of Sea Grant Development. Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant.

Descriptors: *Marine resources, *Ocean environments, *Directories, Universities, Marine biology, Scientists, Aquaculture, Louisiana.
Identifiers: Sea Grant program.

The directory of university-based marine research should enable governmental agencies, private concerns, civic groups, and others to quickly identify where marine-related interests and capabilities reside within the Louisiana academic community. It is also hoped that the directory will facilitate communication of scholarly interests and capabilities among the state's universities. Information was obtained from more than 300 questionnaires sent to university officials, deans, directors, department chairmen and others. Part I of the directory lists university faculty members grouped according to the 79 marine activity categories as designated by the respondents. Part II is a listing of marine-oriented personnel by university affiliation. Finally, Part III is an alphabetical listing of the marine-oriented personnel included in Parts I and II.

COM-75-10912/4GA PC$4.25/MF$2.25
Louisiana State Univ., Baton Rouge. Center for Wetlands Resources.
Terrebonne Parish Nautical Science Program Curriculum.
1974, 68p NOAA-75060513
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant.

Descriptors: *Cargo ships, *Specialized training, *Schools, Water transportation, Mexico Gulf, Mineral industries, Petroleum industry, Career development, Youths, Personnel development, Louisiana, Tugboats, Supply, Ships.
Identifiers: Sea Grant program, Terrebonne Parish(Louisiana), Curricula.

The increase in the dimensions of the transportation segment of the mineral and oil industry, both in the Gulf Coast area and in foreign waters has created a shortage of qualified vessel personnel. To meet this need, a one-year nautical shortage of qualified vessel personnel. To meet this need, a one-year nautical science program was added to the Terrebonne Parish High School (LA) Curriculum in the fall of 1972. This program utilizes guest speakers in specialized areas of instruction. Also, field trips are sponsored to licensing agencies, training facilities, shipyards, and oil and mineral transportation bases.

PB-242 096/6GA PC$3.25/MF$2.25
State Univ. of New York at Stony Brook. Urban Science and Engineering.
Heuristics in Manpower Scheduling.
Urban and policy studies,
L. D. Bodin, A. C. Tucker, S. M. Altman, and E. J. Beltrami. Mar 71, 18p USE-TR-71-7 NSF/RA/S-71-002
Grant NSF-GI-34842

Descriptors: *Personnel management, *Working day variation, Scheduling, Productivity increase, Management methods, Manpower models, Sanitary engineering, New York.
Identifiers: New York City(New York).

To counter the demands of workers that they receive increased benefits (salary, pension, etc.) for their regular duties, management is beginning to demand that the worker increase his productivity to earn increased benefits. Under existing work practices, it often occurs that by varying, or parameters which affect productivity, not only will the productivity of the worker increase, but the benefits to labor will also. In this paper, a procedure for generating the manpower schedule for the Department of Sanitation in New York City is developed. The procedure is general in the sense that it might be applied to a variety of manpower scheduling problems.

PB-242 309/3GA PC$4.25/MF$2.25
Kentucky Water Resources Inst., Lexington.
Directory Kentucky Water Research Personnel.
Technical series,
R. R. Huffsey. Mar 75, 51p Technical Ser-100 W75-08485, OWRT-A-999-KY(2)
Contract DI-14-31-0001-5017

Descriptors: *Water management, *Directories, *Professional personnel, Abilities, Organizations, Human resources, State planning, Kentucky.
Identifiers: Specialization, Water Resources Institute, Water research personnel.

The Directory is a tabulation of Interest Profiles that were distributed throughout the Commonwealth of Kentucky. The Directory section consists of an alphabetic list of water and water-related keywords. Below the keyword is a list of individuals who have indicated a degree of expertise in specific water-related areas. The Directory also includes a list of the Kentucky Water Resources Research Institute's state advisory council. The primary function of this group is to identify significant water research needs throughout the Commonwealth. The University advisory council, which aids the Institute in generating and evaluating water research proposals, is also included.

PB-242 780/5GA PC$7.50/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Longitudinal Evaluation of the Public Employment Program and Validation of the PEP Data Bank.
Final rept.
Apr 75, 238p MEL-75-09
Contract DL-63-08-72-07
Paper copy also available in set of 10 reports as PB-242 779-SET, PC$45.00.

Descriptors: *Public employment, *Federal programs, *Performance evaluation, *Data files, Manpower utilization, Legislation, Program design, Planning, Site surveys, Employment surveys, Economic studies, National government, Social welfare.
Identifiers: Public employment programs, Emergency Employment Act, Validation.

The study was undertaken for the purpose of (1) Evaluating in a longitudinal fashion the effectiveness of the Public Employment Program in meeting the two principal objectives of the Emergency Employment Act of 1971 (EEA), that is, to provide transitional employment to underemployed and unemployed persons and to enable such persons to move into employment or training not supported under the Emergency Employment Act of 1971; and (2) validating the Public Employment Program Data Bank.

PB-242 805/0GA PC$5.25/MF$2.25
Froomkin (Joseph), Inc., Washington, D.C.

Study of Supply Response to Oversupply of College Places.
Final rept. Jun 74-Feb 75,
Joseph Froomkin. Feb 75, 109p* ASPE-75-017
Contract HEW-OS-74-297

Descriptors: *College enrollment, *Attrition(Personnel), *Recruiting, Incentives, Classifications, Universities, Competition, Price rollbacks.
Identifiers: Degree courses.

How can either private or public colleges and universities compete for students. Through what kinds of policies would they be most likely to encourage enrollment in their institutions. This study was designed to answer these questions, which have become relevant because of the near-certainty that the majority of institutions will have a plethora of space and a shortage of applicants during the next ten years. To highlight this position, post-secondary institutions were classified by (a) selectivity, and (b) geographical recruitment area. The institutions were then investigated in terms of recruitment activities including price-cutting, professional and alumni student-hunters, and other methods of recruitment.

PB-242 852/2GA PC$4.25/MF$2.25
National Science Foundation, Washington, D.C. Div. of Science Resources Studies.
Young and Senior Science and Engineering Faculty, 1974: Support, Research Participation, and Tenure.
Final rept.,
Charles H. Dickens. Dec 74, 69p NSF-75-302
Paper copy also available from GPO.

Descriptors: *Instructors, *Universities, *Research projects, Surveys, Statistical data, Classifications, Financing, Research support, Job analysis, Industrial management, Federal programs, Statistical distributions, Time, Tenure.
Identifiers: Science fields, Doctorate degrees, Engineering fields, Classroom teaching.

This report presents an analysis of the data collected in the spring of 1974 from heads of 1,366 doctorate-level departments in the following 15 science and engineering fields: biochemistry, biology, botany, chemical engineering, chemistry, economics, electrical engineering, geology, mathematics, microbiology, physics, physiology, psychology, sociology, and zoology. Survey topics deal with faculty composition, tenure, proportion of faculty active in research, division of research support in research areas of their own choosing, and changes in time spent by faculty in classroom teaching. Data are presented for both young and senior faculty. (Young are defined as those who have held doctorates for 7 years or less). For most topics there are separate presentations of data for departments in public and private institutions, for departments rated as distinguished or strong in an 1970 American Council on Education study, and for the 20 largest departments in each field in terms of fall 1973 full-time graduate enrollment. In addition, comparisons with data from a similar 1968 NSF survey are presented for 602 departments represented in both studies.

PB-242 873/8GA PC$4.75/MF$2.25
Massachusetts Rehabilitation Commission, Boston.
Research Utilization Specialist in the Massachusetts Rehabilitation Commission, 1969-1974.
Final rept.,
Edward L. Tully. Aug 74, 78p SRS-22-55014-002
Grant SRS-22-55014

Descriptors: *Professional personnel, *Technology utilization, Research management, Rehabilitation, Vocational guidance, Consultants, Research projects, Project planning, State programs, Massachusetts.
Identifiers: Vocational rehabilitation, Research utilization.

The objective of this 5-year demonstration project (1969-1974) was to test the value of a Research Utilization Specialist (RUS) in linking research and practice in a vocational rehabilitation agency. Initially emphasis was placed on dissemination of information and utilization of research findings. However, in 1970 program innovation was added as a major goal. This was one of nine such projects, each in a different federal region; it was located in the research unit of the Massachusetts Rehabilitation Commission. The experiences of this project led to a proposal to broaden the concept of the research utilization specialist to knowledge utilization specialist and to the writing of a 'model job description for knowledge utilization specialist'.

PB-242 878/7GA PC$7.00/MF$2.25
Social Welfare Regional Research Inst., Chestnut Hill, Mass.
WIN II Initial Impact Study (Work Incentive Program).
Final rept.
Dec 72, 189p SWRRI-Pub-14 SRS-10-56104-001
Grant SRS-10-56104
Prepared in cooperation with Boston Coll., Chestnut Hill, Mass. Inst. of Human Sciences.

Descriptors: *Social welfare, *State programs, *Employment, Federal financing programs, Public assistance, Vocational training, Unemployed population, Project management, State government, Performance evaluation, Cost summaries, Incentives, Services, Program review.
Identifiers: *Work incentive program, WIN programs, Aid to families with dependent children.

A 1972 project to assess the impact of the work incentive program passed in 1971 (WIN 2) on the administration of WIN in local welfare found that the program was still in the transitional stage in the local welfare offices, that there was greater diversity among office operations as a result of WIN 2, that the program did not affect the clients significantly, that costs for program implementation were higher than had been expected, and that certain factors affected the speed and the extent of implementation in each office.

PB-242 928/0GA PC$4.25/MF$2.25
Arkansas Rehabilitation Research and Training Center, Fayetteville.
Survival Camping: A Therapeutic Mode for Rehabilitating Problem Youth.
Special rept.,
Thomas R. Collingwood. 1972, 54p SRS-16-56812-004
Grant SRS-16-56812

Descriptors: *Youths, *Juvenile delinquency, *Rehabilitation, Projects, Experimental design, Campsites, Survival, Group therapy, Personnel development, Behavior, Physical fitness, Attitudes, Questionnaires, Ratings.
Identifiers: Rugged camping programs, Behavior modification, Survival camping.

The need for a more comprehensive approach to serving male problem youth in Arkansas led to a cooperative effort between the Arkansas Rehabilitation Service, Aldersgate Methodist Camp of Little Rock, and the Arkansas Rehabilitation and Training Center to establish 'camp challenge', a rugged three week camping program. This report details the specifics of developing the camp program and integrating it into a total rehabilitation program. Nineteen boys participated and all showed increased physical fitness, self-confidence, and positive personality change after the camping program. These results were obtained through questionnaires filled out by participants, parents, and rehabilitation counselors as well as physical fitness tests and behavior ratings.

PB-243 060/1GA PC$4.25/MF$2.25
Arkansas Rehabilitation Research and Training Center, Fayetteville.
Issues in Program Evaluation Research in State Rehabilitation Agencies.
Special rept.,
Stanford E. Rubin. Apr 74, 52p ARRTC-817
SRS-16-56812-002
Grant SRS-16-56812
Symposium Presented at the American Personnel and Guidance Association Convention at New Orleans, La., 11 Apr 74.

Descriptors: *Rehabilitation, *Vocational training, *Meetings, Vocational guidance, Training programs, Centers, Program design, Performance evaluation, Environmental issues, Research projects, Measurement, Social characteristics, State programs, Arkansas.
Identifiers: *Vocational rehabilitation.

This report is a collection of papers presented at a symposium of the american personnel and guidance association convention in 1974 by the Arkansas Rehabilitation and Training Center. They explain design and measurement considerations, identify environmental constraints and discuss practical issues in implementing evaluation research. Among the topics discussed are research design, measuring outcomes, assessment of external effects such as social climate, and initiating large scale research efforts in rehabilitation.

PB-243 082/5GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
Why Involve Volunteers in a Rehabilitation Facility. 1. A Handbook.
Special rept.,
Stanley Levin. 1973, 28p SRS-12-55087-003
Grant SRS-12-55087
See also PB-243 083.

Descriptors: *Rehabilitation, *Handbooks, *Management guidelines, Personnel development, Services, Community relations, Social psychology, Project planning, Financing, Professional personnel, Consultants, Improvement, Constraints.
Identifiers: Disadvantaged groups, Volunteers, Benefits, Handicapped persons.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. The handbook emphasizes reasons for involving volunteers. The author cites the following benefits that can be realized within any particular facility which institutes a planned volunteer program: (A) Increased services to handicapped and disadvantaged clients, (B) Bridging clients from the facility to the community, (C) Providing a vital rehabilitation component--someone who really cares, (D) Developing community understanding and cooperation, (E) Instituting social action, (F) Raising funds, (G) Providing administrative, clerical and technical assistance and professional consultations and (H) Bringing people together. A planned volunteer program features thorough organization, competent administration, positive attitudes and creativity. This booklet also treats direct and indirect costs of operation and potential difficulties in implementing an organized volunteer program.

PB-243 083/3GA PC$4.25/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How Volunteers Can Help in a Rehabilitation Facility. 2.
Special rept.,
Stanley Levin. 1973, 61p SRS-12-55087-004
Grant SRS-12-55087

See also PB-243 084.

Descriptors: *Rehabilitation, *Handbooks, Facilities, Management guidelines, Project planning, Services, Recreation, Social goals, Management methods, Public relations, Financing, Group dynamics, Job analysis, Information systems, Objectives, Performance standards, Personnel, Family relations.
Identifiers: *Volunteers, Vocational rehabilitation, Volunteer programs.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. Its emphasis is on activities of a planned volunteer program; others in the series have treated additional aspects of the role of volunteers in vocational rehabilitation. Eight categories are employed to separate and classify volunteer activities: (A) Direct service, (B) Ancillary service, (C) Recreational-social activities, (D) Administrative-clerical activities, (E) Social action, (F) Public relations, (G) Fund raising and (G) Group projects. The handbook offers 101 examples of activities in these eight categories and gives a brief job description on each one, including information on major objectives, major responsibilities, time involved, place of work, qualifications, preparation, supervision, performance requirements, and relationships with other workers, where applicable.

PB-243 084/1GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Organize a Volunteer Program in a Rehabilitation Facility. A Handbook. 3.
Special rept.,
Stanley Levin. 1973, 29p SRS-55087-005
Grant SRS-12-55087
See also PB-243 085.

Descriptors: *Rehabilitation, *Handbooks, Project planning, Organizing, Management guidelines, Management planning, Organization theory, Factor analysis.
Identifiers: *Volunteers, *Volunteer programs, *Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. Its emphasis is on organization of a planned volunteer program; others in the series have treated additional aspects of the role of volunteers in vocational rehabilitation. The author provides a 19-step organization plan, seven basic principles of organization and administration, and 14 key components of good organization and administration. These are offered as a skeleton or framework upon which new volunteer programs can be built.

PB-243 085/8GA PC$4.25/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Administer a Volunteer Program in a Rehabilitation Facility. A Handbook. 4.
Special rept.,
Stanley Levin. 1973, 69p SRS-55087-006
Grant SRS-12-55087
See also PB-243 086.

Descriptors: *Rehabilitation, *Handbooks, Management guidelines, Organizing, Facilities, Leadership, Job analysis, Human resources, Management methods, Recommendations, Vocational guidance, Efficiency, Requirements.
Identifiers: *Volunteers, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. This handbook concerns administration of a volunteer program. The author affirms the need for centralized administration, and points out the qualities a good director of services should have. Also suggested are ways and places to find a director of services for a facility which has none. A director's duties are enumerated and helpful administration techniques are listed. The author distinguished between the classical management approch and the human relations approch to administration and lauds the latter as being much more desirable and effective.

PB-243 086/6GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Recruit Volunteers in a Rehabilitation Facility. A Handbook. 5.
Special rept.,
Stanley Levin. 1973, 35p SRS-12-55087-007
Grant SRS-12-55087
See also PB-243 087.

Descriptors: *Rehabilitation, *Handbooks, Supervisors, Recruiting, Personnel selection, Relevance, Job analysis, Equal employment opportunities, Policies.
Identifiers: *Volunteers, Job descriptions, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. The author states three principles important to recruitment: (1) the participation of volunteers must be directly related to the needs of the people served, (2) it is advantageous to specifically define volunteer jobs and duties, (3) volunteers must be recruited for jobs and assignments that actually exist. In addition, specified personnel must be delegated to coordinate recruitment efforts; job descriptions must be made available, and there must be continuous practice of recruitment measures. It is stressed that the doctrine of equal opportunity should apply to matters of recruitment--all races, religions, ages, nationalities, and minorities should be accepted and given an equal chance to participate in rehabilitation services.

PB-243 087/4GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Interview and Place Volunteers in a Rehabilitation Facility. A Handbook. 6.
Special rept.,
Stanley Levin. 1973, 39p SRS-12-55087-008
Grant SRS-12-55087
See also PB-243 088.

Descriptors: *Rehabilitation, *Handbooks, Management guidelines, Interviews, Supervisors, Community relations, Methodology, Vocational interests, Placement, Project planning, Classifications, Personnel selection.
Identifiers: *Volunteers, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. It is concerned with interviewing and placement of volunteers. The author reviews different types of interviews: Community, general entrance and specific entrance, as well as exit and follow-up, and discusses techniques by which they are achieved. He also outlines a 22-step procedure for interviewing prospective volunteers. Interviewers are cautioned that under- and over-placement are definitely problems to be avoided, and that particular care should be taken with regard to underplacement.

PB-243 088/2GA PC$4.25/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Prepare Volunteers to Help in a Rehabilitation Facility. A Handbook. 7.
Special rept.,
Stanley Levin. 1973, 57p SRS-12-55087-009
Grant SRS-12-55087
See also PB-243 089.

Descriptors: *Rehabilitation, *Handbooks, Supervisors, Specialized training, Management guidelines, Roles(Behavior), Learning, Project planning, Recommendations, Orientation(Training), Leadership, Personnel development.
Identifiers: *Volunteers, Volunteer programs.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. Its emphasis is on preparation of volunteers; others in the series have treated additional aspects of the role of volunteers in vocational rehabilitation. This booklet includes training and orientation programs. The author suggests factors important to creative learning and techniques to facilitate and make interesting the training and orientation process. Lectures, panel discussions, and symposia are seen as outdated and overworked methods. The author presents sample content generally included in orientation programs. It is recommended that orientation be provided every three months.

PB-243 089/0GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Supervise and Evaluate Volunteers in a Rehabilitation Facility. A Handbook. 8.
Special rept.,
Stanley Levin. 1973, 42p SRS-55087-013
Grant SRS-12-55087
See also PB-243 090.

Descriptors: *Rehabilitation, *Handbooks, Supervisors, Personnel selection, Management guidelines, Performance standards, Meetings, Performance evaluation, Discharge, Time, Objectives, Management information systems.
Identifiers: Qualifying, *Volunteers, Vocational rehabilitation.

This is one of a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. This booklet focuses on how to supervise by dealing with (1) Definitions, (2) Purposes and objectives, (3) Effects, (4) Principles and techniques, (5) Supervisory roles, (6) Qualities and qualifications of supervisors, (7) Timing considerations and (8) Conference techniques. Less extensively, it deals with evaluating volunteer performance and firing volunteers. A two-page volunteer evaluation form is given as an appendix.

PB-243 090/8GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Motivate Volunteers in a Rehabilitation Facility. A Handbook. 9.
Special rept.,
Stanley Levin. 1973, 30p SRS-55087-014
Grant SRS-12-55087
See also PB-243 091.

Descriptors: *Rehabilitation, *Handbooks, Supervisors, Motivation, Management guidelines, Personnel management, Participative management, Roles(Behavior), Job satisfaction, Productivity, Expectations.
Identifiers: *Volunteers, Vocational rehabilitation.

This is one of a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. This booklet stresses the importance of volunteer satisfaction and how it affects productivity. It advises emphasizing the importance of volunteers, facilitating satisfaction of volunteers, expectations reflecting sincere

care and appreciation for volunteers' accomplishments, extending opportunities for maximum use of skills and experiences, providing avenues for growth and development, encouraging participation in program planning, implementation and evaluation, and offering volunteers meaningful roles and assignments.

PB-243 091/6GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Incorporate Group Volunteering in a Rehabilitation Facility. A Handbook. 10.
Special rept.,
Stanley Levin. 1973, 29p SRS-12-55087-010
Grant SRS-12-55087
See also PB-243 092.

Descriptors: *Rehabilitation, *Handbooks, Management guidelines, Project planning, Facilities, Group dynamics, Recommendations, Community relations, Vocational guidance, Classifications, Organizations.
Identifiers: Volunteers, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. This handbook concerns group volunteering in a rehabilitation facility. Studies have shown the group approach to be more effective than the individual approach, so the author highly recommends group volunteering and explains its incorporation into facility and community organizations and projects.

PB-243 092/4GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
How to Assure Responsible Volunteering in a Rehabilitation Facility. A Handbook. 11.
Special rept.,
Stanley Levin. 1973, 44p SRS-12-55087-011
See also PB-243 093.

Descriptors: *Rehabilitation, *Handbooks, Supervisors, Performance standards, Vocational interests, Management guidelines, Personnel management, Documents, Quality assurance, Recommendations, Management information systems, Trends, Policies, Management methods, Leadership.
Identifiers: *Volunteers, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. This handbook concerns assuring responsibility in volunteers: others have treated additional aspects of the role of volunteers in vocational rehabilitation. Four procedures and considerations are suggested to help assure responsible volunteer performance: (1) awareness of current trends in volunteering, (2) volunteer manuals, (3) personnel policies for volunteers and (4) responsible leadership. Suggestions are given on how to achieve and conduct these procedures. Much supplementary material is appended.

PB-243 093/2GA PC$3.75/MF$2.25
National Auxiliary to Goodwill Industries, Washington, D.C.
Catalog of Resources: Volunteers in Rehabilitation Facilities. A Handbook. 12.
Special rept.,
Stanley Levin. 1973, 50p SRS-12-55087-012
Grant SRS-12-55087
See also PB-243 082.

Descriptors: *Rehabilitation, *Handbooks, Organizations, Documents, Visual aids, Data files, Vocational guidance, Resources, Catalogs(Publications), Management guidelines, Project planning.
Identifiers: *Volunteers, Audiovisual instruction, Vocational rehabilitation.

This is one in a series of 12 handbooks prepared by Goodwill Industries to provide guidelines for volunteers and volunteer programs. It is a catalog of resources for rehabilitation volunteers. Identified in the handbook are sources of specific and general information, compiled within the following four categories: (A) Agencies and organizations, (B) Publications, (C) Literature and (D) Audiovisual material.

PB-243 306/8GA PC$7.00/MF$2.25
Wisconsin Univ.-Stout, Menomonie. Materials Development Center.
Work Evaluation and Adjustment. An Annotated Bibliography, 1947-1973. (1972 Supplement).
Special rept.,
Ronald R. Fry. Jun 73, 180p SRS-12-55307-004
Grant SRS-12-55307

Descriptors: *Employment, *Bibliographies, *Work measurement, *Adjustment(Psychology), Evaluation.

The bibliography covers primarily the 1972 literature on work evaluation and work adjustment. It is the fifth in a series of annual annotated bibliographies published by the Materials Development Center. It contains 76 citations which form a supplement to 581 citations previously published. The publication also contains an extensive permuted title index and an author index.

TT-74-53392/1 MF$2.25
Office of Education, Washington, D.C.
Selected Bibliography of Educational Materials in Pakistan. Volume 8, Number 1, Jan-Mar 74.
1974, 58p
The above journal is translated on a regular basis. Portions of this document are not legible.
Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.
Available in microfiche only.

Descriptors: *Education, *Pakistan, *Bibliographies, Abstracts, Adult education, Planning, Classifications, Children, Female, Objectives, Specialized training, Instructors.
Identifiers: Curricula.

A bibliography on educational materials in Pakistan contains abstracts on adult, agricultural, health, Islamic, science, teacher, medical, language, technical, and women's education; educational goals, planning, reforms, research, philosophy, psychology, guidance, and methods; and examinations, libraries, children's literature, and textbooks. Portions of this document are not fully legible.

5J. Psychology (Individual and Group Behavior)

AD-A012 023/8GA PC$6.25/MF$2.25
Michigan Univ Ann Arbor Human Performance Center
The Effect of Time Sharing on the Performance of Information Processing Tasks: A Feedback Control Analysis.
Technical rept.,
Christopher Dow Wickens. Aug 74, 166p Rept nos. TR-51, 010588-21-T AFOSR-TR-75-0906
Contract F44620-72-C-0019

Descriptors: *Performance(Human), *Attention, *Time sharing, Performance tests, Tracking, Information processing, Auditory signals, Manual operation, Test methods, Signal to noise ratio, Errors, Feedback.
Identifiers: *Divided attention, Task performance.

The limited nature of man's attentional processes is a fundamental principle that underlies any general theory of human performance or human information processing. However, psychologists have been unable to settle upon a precise definition of the term attention. One approach that can be taken toward clarifying ambiguity in the meaning of attention is to study man's behavior in a time sharing paradigm, one in which attention must be shared between the performance of two or more tasks. The purpose of the current research was to examine these time-sharing effects in a manual tracking paradigm, employing the fine-grained analysis provided by the techniques of feedback control theory.

AD-A012 097/2GA PC$4.75/MF$2.25
Michigan Univ Ann Arbor Human Performance Center
Human Perceptual-Motor Performance.
Technical rept.,
Richard W. Pew. Aug 74, 83p Rept nos. 010588-20-B, TR-48 AFOSR-TR-75-0907
Contracts F44620-72-C-0019, NSR-23-005-364
Sponsored in part by National Aeronautics and Space Administration, Washington, D.C. Contract NASr-54(06).

Descriptors: *Perception(Psychology), *Motor reactions, *Performance(Human), Information processing, Feedback, Memory(Psychology), Tracking, Errors, Control systems, Response, Mathematical models.
Identifiers: *Motor skills, Information processing(Psychology).

The paper presents a tutorial review of the current status of work on perceptual motor skills from the joint perspectives of information processing and feedback control. The organizing theme for the discussion is a multi-level conception of motor control involving (1) an elementary error-correction system; (2) higher level feedback and control functions describing how man responds to the predictable characteristics of input signals and (3) a schema based memory and response execution system for describing voluntary movement capacities. Elementary concepts of feedback control are introduced together with discussion of the role of feedback on performance, in tracking, and in voluntary movement.

AD-A012 149/1GA PC$3.25/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Simultaneous Processing of Bisensory Information.
Technical memo (Final),
Lynn C. Oatman. May 75, 23p Rept no. HEL-TM-9-75

Descriptors: *Information processing, *Performance(Human), *Senses(Physiology), Auditory acuity, Visual acuity, Stimuli, Performance tests, Auditory signals, Redundancy, Detection, Vigilance, Theory, Auditory signals, Visual signals.
Identifiers: Simultaneous stimuli, Information processing(Psychology).

The research on the simultaneous presentation of auditory and visual information has been reviewed and the issues examined as to whether the human operator can perform better when the same information is transmitted simultaneously through both the auditory and visual channels than when a single auditory or visual channel is used. The implications of the research may be summarized by saying that the data generally support some propositions which have implications for the design of military displays employing simultaneous auditory-visual presentations.

AD-A012 281/2GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia
Alcohol and Drug Abuse in the Vietnam Veteran.
Annual summary rept. Nov 73-Nov 74,
Charles P. O'Brien, Edgar P. Nace, and Andrew L. Meyers. 8 Jan 75, 22p
Contract DAMD17-74-C-4015

Descriptors: *Veterans(Military personnel), *Addiction, Vietnam, Alcoholism, Drug abuse, Questionnaires, Adjustment(Psychology), Data acquisition, Performance(Human), Behavioral science.

This is an interim report of a follow-up study of Vietnam veterans being conducted to determine their post-service adjustment. Men who served in Vietnam and were either treated in a drug detoxification center or were hospitalized for a non-drug problem comprise the sample population. A questionnaire was developed to obtain information from the subjects who have been split into two groups: those who reported a positive urine test in Vietnam, and those who reported no urine test. Additional interviews and data analysis are in progress and will be included in a final report.

AD-A012 395/0GA PC$3.25/MF$2.25
Minnesota Univ Minneapolis Dept of Psychology
Effects of Social Class Differences on Analogical Reasoning.
Rept. no. 9 (Final), 15 Apr 72-31 Dec 74,
Rene V. Dawis. Feb 75, 22p
Contract N00014-67-A-0113-0030

Descriptors: *Reasoning, *Sociometrics, *Hypotheses, Analogies, Culture, Test construction(Psychology), Test methods.
Identifiers: Eduction, Analogy tests, Social class effects.

Spearman's formulation of analogical reasoning as a three-stage process (apprehension of elements, eduction of relations, and eduction of correlates) appears to be useful in the study of analogical reasoning. In this project, minimizing the role of element apprehension and manipulating relation eduction levels resulted in the unexpected finding of minimal effects due to social class. It is concluded that the effects of social class differences on analogical reasoning are to be found primarily in the stage of apprehending the elements.

AD-A012 421/4GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
Utility Induced Subjective Probability.
Technical rept.,
D. R. Barr, and F. R. Richards. Jan 75, 33p Rept no. NPS-55BN75011

Descriptors: *Decision making, *Game theory, *Decision theory, Statistical decision theory, Uncertainty, Probability, Mathematical models, Selection, Theorems.
Identifiers: Subjective probabilities, Utility theory, Preferences.

The well known principle that subjective probabilities are determined from preference comparisons among finite compound lotteries is extended to a more general framework. Several assumptions made in the earlier work have been shown to be unnecessary. Applications to a variety of situations, including statistical decision problems, are discussed.

AD-A012 422/2GA PC$3.75/MF$2.25
Naval Postgraduate School Monterey Calif
Managing Organizational Conflict: When To Use Collaboration, Bargaining and Power Approaches.
Working paper,
C. Brooklyn Derr. Jun 75, 41p Rept no. NPS-55Dr75061

Descriptors: *Conflict, *Organizations, *Applied psychology, *Personnel management, Interpersonal relations, Cooperation, Bargaining, Power, Management planning and control, Emotions, Resolution.
Identifiers: Intervention.

A contingency theory for managing conflicts in organizational settings is proposed. Using collaboration, bargaining and power approaches to conflict management are all appropriate given certain situations. These situations and the costs and benefits of using a given strategy under varying conditions are discussed.

N75-24297/4GA PC$4.75/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Medical Requirements and Examination Procedures in Relation to the Tasks of Today'S Aircrew: Comparison of Examination Techniques in Neurology, Psychiatry and Psychology with Special Emphasis on Objective Methods and Assessment Criteria.
H. Oberholz. Mar 75, 100p AGARD-CP-153
Conf-Presented at the Aerospace Medical Panel Meeting, Naples, 16-20 Sep. 1974.
In English; Partly in French.

Descriptors: *Conferences, *Flight fitness, *Military psychology, *Neurology, *Physical examinations, *Psychiatry, Electroencephalography, Multivariate statistical analysis, Pilot performance, Psychological factors.

For abstract, see STAR 1315

PB-242 054/5GA PC$4.25/MF$2.25
National Pretrial Intervention Service Center, Washington, D.C.
Legal Issues in Addict Diversion. A Layman's Guide,
Harvey S. Perlman. Sep 74, 65p* DLMA-21-11-73-32-04
Contract DL-21-11-73-32
Prepared in cooperation with American Bar Association, Chicago, Ill. Commission on Correctional Facilities and Services, and Drug Abuse Council, Washington, D.C.

Descriptors: *Drug addiction, *Legal opinions, Law(Jurisprudence), Identifying, Interviews, Medical examination, Rehabilitation, Program design, Diverting, Personnel selection, Criminal courts.
Identifiers: Drug abuse, Legal aspects, Pretrial intervention, Terminating, *Diversion programs.

The report analyzes legal issues in addict identification (by drug use interviews and urinalysis), legal issues in the selection and admission of addicts into diversion programs, legal issues in the administration of programs, and the termination of clients. Legal citations are included.

PB-242 999/1GA PC$5.25/MF$2.25
Arkansas Rehabilitation Research and Training Center, Fayetteville.
Training Manual: Empathy, Warmth, Genuineness.
Special rept.,
Jerold D. Bozarth, and Conrad C. Krauft. 1973, 112p ARRTC-667 SRS-16-56812-003
Grant SRS-16-56812

Descriptors: *Psychotherapy, *Interviews, *Counseling, Mental disorders, Manuals, Training devices, Psychological guidance, Responses, Evaluation, Rehabilitation, Personnel, Emotions, Personality.

The importance of the counselor's or therapist's characteristics of empathy, warmth, and genuineness in client improvement has been established in a number of studies. This manual was prepared as a means of fostering these qualities. It was prepared by rating segments of interviews taped in psychotherapy sessions and giving examples of the therapist's varying degrees of achievement of desirable characteristics. The manual serves either as a teaching model, or as a procedure for those who wish to evaluate their own responses.

5K. Sociology

COM-75-10846/4GA PC$8.50/MF$2.25
Michigan Univ., Ann Arbor.
The Social and Economic Importance of the Caroni Swamp in Trinidad and Tobago.
Doctoral thesis,
Bal Siew Ramdial. 1975, 270p NOAA-75052010
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant and Organization of American States, Washington, D.C.

Descriptors: *Swamps, *Recreation, *Trinidad and Tobago, Economic factors, Tourist trade, Recreational facilities, National parks, Caroni Swamp.
Identifiers: Sea Grant program.

The report studies the social and economic values of the Caroni Swamp as of 1974. Based on the results of its investigation, the report concludes that the swamp, though neglected, has many social and economic values beyond tourism. The Caroni Swamp is biologically very productive and is aesthetically a pleasant environment. It has the capability for resolving relative problem states and the potential for increasing the social and economic values beyond current levels of use. Therefore, it is worthy of preservation. The report recommends that the swamp be declared a National Park.

COM-75-10885/2GA PC$6.25/MF$2.25
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, Miss.
Demographic Composition and Growth Components of the Coastal Region of Mississippi. Part 3. A Study of Its Peripheral Nonmetropolitan Areas. Analysis and Maps,
Ellen S. Bryant, and Carolton R. Sollie. Feb 75, 160p MASGP-75-003 NOAA-75060511
Prepared by Mississippi State Univ., Mississippi State. Dept. of Sociology.

Descriptors: *Demography, *Population census, *Housing census, *Mississippi, Coasts, Census tracts, Enumeration districts, Mexico Gulf, Population growth, Social characteristics, Labor force, Poverty level, Housing studies, Maps.
Identifiers: Sea Grant program, Biloxi(Mississippi), Computer mapping, Gulfport(Mississippi).

The purpose of the project is to provide leaders and planners with a detailed population and housing analysis of the Mississippi Coastal region. Three levels of analysis are presented: The first focuses on the Coastal area as a unit; the second focuses on the census tracts of the Biloxi-Gulfport area; and the third focuses on small areas (Enumeration Districts) surrounding the urbanized central core of the Biloxi-Gulfport SMSA and is the subject of this report. Descriptive in nature, this report is a catalogue of data which the planner can consult and use as a base for his planning work. The techniques used in depicting the findings were selected to give understandable summaries of descriptive statistics. Extensive use has been made of computer mapping of summary population and housing indexes. Some areas covered in this report are: population stability, population heterogeneity, quality potential, dependency, familism, social disorganization, labor force, industrial lag, poverty, housing affluence, and housing inadequacy.

COM-75-10886/0GA PC$5.75/MF$2.25
Mississippi-Alabama Sea Grant Consortium, Ocean Springs, Miss.
Demographic Composition and Growth Components of the Coastal Region of Mississippi. Part 3. A Study of Its Peripheral Nonmetropolitan Areas. Appendix,
Ellen S. Bryant, and Carlton R. Sollie. Feb 75, 135p MASGP-75-003-A NOAA-75060512
Continuation of rept. no. MASGP-75-003, COM-75-10885. Prepared by Mississippi State Univ., Mississippi State. Dept. of Sociology.

Descriptors: *Demography, *Population census, *Housing census, *Mississippi, Coasts, Census tracts, Enumeration districts, Mexico Gulf, Population growth, Social characteristics, Labor force, Poverty level, Housing studies, Maps.
Identifiers: Sea Grant program, Biloxi(Mississippi), Computer mapping, Gulfport(Mississippi).

The report is a continuation of the Analysis and Maps section of Demographic Composition and Growth Components of the Coastal Region of Mississippi, A Study of its Peripheral Nonmetropolitan Areas. It contains 17 tables of data and statistics covering such areas as: housing, age of population, employment, race, sex, income distribution, and poverty.

NTIS/PS-75/575/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Transportation for the Elderly or Physically Handicapped (A Bibliography with Abstracts).
Rept. for 1964-May 75,
Mary E. Young. Jul 75, 46p*
Supersedes COM-74-10887.

Descriptors: *Passenger transportation, *Bibliographies, *Handicapped persons, *Senior citizens, Transportation planning, Urban transportation, Transit riders, Travel, Regional planning, Rural areas, Problem solving, Services, Old age, Barriers.
Identifiers: *Elderly persons, Transportation for the aged, Transportation for the handicapped.

Reports on planning for public transportation for older persons or those persons who are physically disabled are abstracted in the bibliography. Included are studies of difficulties encountered, special design, and real and potential use of facilities. (Contains 41 abstracts).

PB-242 316/8GA PC$4.25/MF$2.25
American Justice Inst., Sacramento, Calif.
First Year Santa Clara County Day Care Center Evaluation.
1972, 73p
Contract LEAA-NI-72-09-0001

Descriptors: *Maladjusted adolescents, *Day care centers, *Social welfare, Probation, Feasibility, Family relations, Juvenile delinquency, Behavior, Cost effectiveness, Motivation, Program evaluation, Counseling, Attitudes, California, Recommendations.
Identifiers: Alternatives, Self concept, Santa Clara County(California).

The youths attended the center during the day for school and individual or group counseling, while continuing to live at home. Objectives of the program were to increase academic achievement, improve attitude and motivation toward education, decrease post-center truancy and recidivism, and improve the self-esteem of the individual. A group of 62 experimental and 43 control youth provides the base for analysis. In the first year of operation, cost, in terms of monthly expenditure per child, is the major negative aspect. Suggestions are given to solve this problem. The authors also suggest modifications in the program for the third year of operation.

PB-242 321/8GA PC$4.25/MF$2.25
American Justice Inst., Sacramento, Calif.
Santa Clara County Day Care Treatment Center for Delinquents.
Final evaluation rept.,
Ann C. Lampkin, and Gary G. Taylor. Aug 74, 53p
See also report dated Aug 73, PB-239 486. Prepared in cooperation with California Council on Criminal Justice, Sacramento.

Descriptors: *Juvenile delinquency, *Day care centers, *Probation, Projects, Program review, Performance evaluation, Treatment, Education, Program design, Recommendations, California.
Identifiers: Day care centers, Recidivism, Santa Clara County(California), Alternatives.

The day care center is a location where youngsters go during the day for school and group or individual counseling, while continuing to live at home. Juveniles remain in the formalized education and treatment program for approximately four months. Then they graduate into eight months of aftercare. Evaluation measures included recidivism, academic achievement, school adjustment self-concept, family functioning, and cost-effectiveness. The center was also assessed as an alternative to out of home placement. Evaluators concluded that the program was a viable alternative to 24-hour institutional care and should be continued if steps could be taken to reduce the relatively high recidivism rate associated with the program.

PB-242 368/9GA PC$3.75/MF$2.25
Utah Water Research Lab., Logan.
Economic Value of Water-Oriented Recreation Quality,
E. Boyd Wennergren, Herbert N. Fullerton, John E. Keith, and Robin Meale. Jan 75, 29p
PRRAE805-1 W75-08469, OWRT-C-4371(9064)(2)
Contract DI-14-31-0001-9064

Descriptors: *Lakes, *Recreational facilities, *Site surveys, Economic analysis, Quality, Property values, Linear programming, Recreation, Boats, Idaho, Utah.
Identifiers: Recreational boating.

The objectives of the study were: (a) to develop a system of analysis which permits segregation of total site values into quality and location components, (b) to make empirical estimates for pleasure boating in Utah and Idaho, (c) to identify site characteristics that explain site quality differentials, (d) to compare site value estimates based on the concepts of economic rent and consumer surplus. A linear programming system was developed to segregate total site values into location and quality components. Empirical value estimates, both aggregate and quality, were made for 42 boating sites in Utah and 69 sites in Idaho.

PB-242 625/2GA PC$3.75/MF$2.25
Booz, Allen Public Administration Services, Inc., Washington, D.C.
The Human Service Needs of People with Drinking Problems.
Final outline statement.
30 Jul 73, 29p NIAAA/NCALI-75-20
Contract HSM-42-73-111
See also PB-242 626.

Descriptors: *Alcoholism, *Social welfare, Services, Drugs, Therapy, Rehabilitation, Recommendations, Requirements.
Identifiers: Drug abuse, *Drug treatment programs, *Human services, *Problem drinkers, Community health services.

The report contains an outline description of the human service needs of people with drinking problems and the process by which communities can provide these services. Recommendations are categorized in terms of general planning considerations, including: (1) The importance of both specific types of human services and the spirit of human encounter in the development of service delivery strategies; (2) awareness of both the general and unique human service needs of problem drinkers; (3) awareness of dangers from institutional and emotional barriers to the fulfillment of human service needs; and (4) the specific process by which a community can meet the general needs of its population and the unique needs of problem drinkers. The report is intended to stimulate discussion rather than to provide definitive answers on the issues raised.

PB-242 626/0GA PC$3.25/MF$2.25
Booz, Allen Public Administration Services, Inc., Washington, D.C.
The Parameters of Responsible Alcohol Taking.
Final outline statement.
30 Jul 73, 24p NIAAA/NCALI-75-21
Contract HSM-42-73-111
See also PB-242 625.

Descriptors: *Alcoholism, Psychological effects, Physiological effects, Rehabilitation, Drugs, Human behavior, Habits, Sociology.
Identifiers: *Drug abuse, Problem drinkers, Alcohol ingestion.

The report presents a framework for defining the parameters of responsible alcohol taking and for discussing the contextual nature of alcohol use and misuse. The framework is organized to present various theses, including: (1) The primacy of individual choice with regard to drinking practices; (2) responsible and irresponsible drinking as a distinction determined by the individual within the context of societal consequences; (3) the need for individual awareness as to one's own parameters of responsible alcohol taking; (4) the need for alternatives to those drinking behavior patterns which lead to negative consequences; and (5) the capability of American Institutions to promote conditions which facilitate responsible drinking habits. The report is intended to be a starting point for NIAAA in developing dialogues on the subject with various elements of the population.

PB-242 672/4GA PC$8.75/MF$2.25
Oklahoma Univ., Norman. Office of Research Administration.
Perspectives on Police Assaults in the South Central United States. Volume I.
Final rept.,
Samuel G. Chapman, Charles D. Hale, C. Kenneth Meyer, Cheryl G. Swanson, and Patton N. Morrison. Jun 74, 278p
Grants LEAA-73-DF-06-0053, LEAA-73-TA-06-0004
See also PB-274 673.

Descriptors: *Police, *Conflict, Social conditions, Municipalities, State activities, Officer personnel, Criminal psychology, Demography, Hypotheses.
Identifiers: *Assaults, Violence, Highway patrols, Police officers, Assailants, South Central Region(United States).

Following a description of project objectives and methodology, the report discusses a theoretical perspective of violence as it relates to assaults against police. It is a hypothetical statement about the underlying causes of violence against police and suggests that assaults on police are an inevitable consequence of the police role in society. The final section contains a descriptive profile of the assault event in which a number of characteristics con-

cerning police are examined for both municipal police departments and state police and highway patrol agencies. Statistical information is given in tables, broken down by demographic and geographic characteristics of both the assaulter and the police officer.

PB-242 673/2GA PC$8.50/MF$2.25
Oklahoma Univ., Norman. Office of Research Administration.
Perspectives on Police Assaults in the South Central United States. Volume II.
Final rept.,
Samuel G. Chapman, Charles D. Hale, C. Kenneth Meyer, Cheryl G. Swanson, and Patton N. Morrison. 28 Jun 74, 275p
Grants LEAA-73-TA-06-0004, LEAA-DF-06-0053
See also PB-242 674.

Descriptors: *Police, *Conflict, Demography, Criminal psychology, Comparative studies, Personality, Attitudes, Oklahoma, New Mexico, Arkansas, Texas, Louisiana.
Identifiers: *Assaults, Assailants, Police officers, Violence, Personal characteristics, South Central Region(United States).

The second volume of a final report on assaults on Police Officers in 1973 in Oklahoma, New Mexico, Arkansas, Texas and Louisiana Discusses Characteristics of Police Officers and their assaulters to identify assault prone officers. This document includes a discussion of the characteristics which differentiate assaulted officers and their non-assaulted counterparts. The next section includes a discussion of the characteristics of persons charged with assaulting police officers and their reasons for acting as they did. The final section in this volume discusses alternative methods for developing psychological tests that may help to identify personality characteristics associated with 'assault prone' officers.

PB-242 674/0GA PC$5.25/MF$2.25
Oklahoma Univ., Norman. Office of Research Administration.
Perspectives on Police Assaults in the South Central United States. Volume III.
Final rept.,
Samuel G. Chapman, Charles D. Hale, C. Kenneth Meyer, Cheryk G. Swanson, and Patton N. Morrison. 28 Jun 74, 121p
Grants LEAA-73-TA-06-0004, LEAA-73-DF-06-0053
See also PB-242 673.

Descriptors: *Police, *Conflict, *Psychometrics, Perception, Comparative studies, Municipalities, Environmental aspects, Correlations, Regression analysis, Texas.
Identifiers: *Assaults, *Police officers, *Assailants, Violence, Austin(Texas), South Central Region(United States).

The first study of this volume focuses on the police organization in an effort to determine whether or not assulted officers perceive their working environment differently than non-assaulted officers. Next, the relationship between police assaults and 31 environmental and police activity characteristics is examined for 46 cities using correlation and multiple regression analysis techniques. Following this, the results of a micro analysis of assaults on police in Austin, Texas are reported. This volume concludes with a comprehensive bibliography of literature which, although selected from many diverse fields, was found to be integrally related to the problem of police assaults.

PB-242 745/8GA PC$4.75/MF$2.25
New Mexico Univ., Albuquerque. Criminal Justice Program.
Analysis of Armed Robbery in Albuquerque,
William Parras, and Joseph W. Pedroncelli. 6 Jul 73, 84p CJP-73-4
Contract LEAA-NI-06-002

Descriptors: *Criminology, *Pattern recognition, *Statistical reports, New Mexico, Statistical methods, Crimes, Classifications, Time, Police, Small arms, Variations, Seasonal variation.
Identifiers: *Armed robberies, *Albuquerque(New Mexico).

The report describes trends in armed robbery over a five-year period and patterns of armed robbery reported to the Albuquerque police during a two-and-one half month period. Armed robbery is discussed as a seasonal crime; the last six months of each year examined in this study experienced higher incidences of armed robbery than did the first six months. Analysis of the patterns of armed robbery indicated that most armed robberies occurred during the police department's swing shift (70%), occurred between 5 p.m. and 12 a.m. (74%), occurred at convenience food stores, commercial establishments and on the highway (86%), were committed by lone offenders (65%), and involved extensive use of firearms (74%).

PB-242 814/2GA PC$5.25/MF$2.25
Wyoming Univ., Laramie. Div. of Agricultural Economics.
Recreation Reimbursement for Wyoming's North Platte River Basin.
Master's thesis,
A. S. Hersch. Feb 74, 113p W75-08922, OWRT-C-4351(9063)(1)

Descriptors: *Recreation, *Water resources, *North Platte River Basin, Pricing policies, Cost analysis, Payment, Licenses, Economic factors, Social effect, Taxes, Economic impacts, Income, Theses, Wyoming.
Identifiers: Reimbursement.

Development of feasible pricing and reimbursement mechanisms for recreation in Wyoming's North Platte River Basin were based on identification of groups likely to benefit from water resource development projects and conceptualization of the nature of such benefits. Reimbursement mechanisms that might be utilized in project financing are proposed and defined, and alternative reimbursement mechanisms are evaluated utilizing the efficiency, equity, administrative feasibility, and revenue raising ability criteria, with consideration of the various beneficiary groups and the multi-dimensional nature of the project benefits. The selected sites for the study were Glendo Reservoir, Alcova Reservoir, and the 'Miracle Mile.' An attempt was made to ascertain the incidence and direction (positive or negative) of economic impacts of recreation projects upon certain beneficiary sectors and groups. Three accounts--(1) development or economic efficiency, (2) environmental/recreational quality, and (3) social factor effects--were utilized in conceptualizing recreation project impacts. A recommended set of reimbursement mechanisms for each area is proposed with emphasis on a marine fuel tax, Federal-local transfer payments, and facility use fees.

PB-242 869/6GA PC$6.25/MF$2.25
Child Welfare League of America, Inc., New York. Research Center.
Service to Children in Their Own Homes: Its Nature and Outcome.
Final rept.,
Edmund A. Sherman, Michael H. Phillips, Barbara L. Haring, and Ann W. Shyne. 1973, 163p ISBN-0-87868-106-X SRS-89-80049-002
Grant SRS-89-80049

Descriptors: *Social welfare, *Children, *Child care, Services, Family relations, Feasibility, Projects, Program design, Performance evaluation, New York, Metropolitan areas.
Identifiers: Alternatives, New York City(New York), Own home care(Social services).

A project (1969-1971) designed to identify and examine factors that determine the decision to place a child in substitute care or instead to attempt to meet his needs by providing services to him and his family in his own home and to investigate in detail the nature, content, and outcome of own-home service found the program successful in offering valuable insight into the nature and outcome of child welfare services. The project involved 4 agencies within a 300-mile radius of New York and provided own-home service for 184 cases involving 429 children.

PB-242 872/0GA PC$6.25/MF$2.25
Ljubljana Univ. (Yugoslavia). Inst. of Criminology.
Rehabilitation of Juveniles in Ljubljana.
Final rept.,
Alenska Selih. 1972, 160p SRS-19-58390-001
Grant SRS-19-58390

Descriptors: *Juvenile delinquency, *Rehabilitation, *Yugoslavia.

A project (1970-1971) to examine the educational measures applied to juveniles by the court in Ljubljana and the level of rehabilitation after termination of these measures found many weaknesses in the implementation of educational measures, that only one-half the juveniles were contacted in reprimand cases, that disciplinary centers had few methodological guidelines, that social welfare workers contacted juveniles only once a month when under supervision of the agency, and that there was neglect in aftercare of juveniles whose measure had been removed and among those who had left institutions.

PB-242 932/2GA PC$4.75/MF$2.25
University of Southern California, Los Angeles. Regional Research Inst. in Social Welfare.
Evaluation of the Effectiveness of Public Social Services: A Methodological Study,
Evelyn Hall Ogren. Nov 73, 91p SRS-10-56033-008
Grant SRS-10-56033

Descriptors: *Social welfare, *Services, Effectiveness.

The study explores evaluation research methodology and outlines a procedure for evaluation of the effectiveness of on-going public social service programs. Following an extensive review of the literature, a service delivery evaluation model was developed. The model was applied to case activities in two public service subsystems and conclusions were drawn from both the empirical studies and a theoretical analysis.

PB-242 933/0GA PC$3.25/MF$2.25
Abt Associates, Inc., Cambridge, Mass.
Housing Evaluation Survey, Administrative Agency Experiment of the Experimental Housing Allowance Program.
30 Mar 73, 6p H-2-5A OMB-63-S73004
Contract HUD-H-1782

Descriptors: *Housing studies, *Forms(Paper), Houses, Apartments, Household characteristics, Sample surveys, Residential buildings, Neighborhoods, Heating and cooking equipment, Quality, Ceilings(Architecture), Floors, Windows, Electric power, Plumbing, Refuse, Dimensions, Ratings, Surveys.
Identifiers: Pre post evaluations, Housing allowances.

This survey form is to be used in a pre-post evaluation of housing quality among a sample of program participants. The form gathers information on the dwelling unit interior, the building, and the neighborhood. Most of the data collected on this form rely on dichotomous

measurements (the presence or absence of a feature in the dwelling, such as a working or not working stove) or a four-point rating scale of quality on such items as ceiling surface, and floor condition.

PB-243 004/9GA PC$4.25/MF$2.25
Urban Inst., Washington, D.C.
A Final Report on the S.R.S. Planning Assistance Grant to the Urban Institute,
Jerry Turem. 1974, 58p SRS-18-56653-001
Grant SRS-18-56653

Descriptors: *Social welfare, *Project planning, *Rehabilitation, Grants, Program review, Research and development, Program design, Group dynamics, Senior citizens, Financing, Communications management, Technical assistance, Systems analysis, Personnel development, State programs, Fees, Drug addiction, Counseling, Vocational guidance, Unskilled workers, Wage subsidies, Medical care, Older workers, Juvenile delinquency, Computer aided design.
Identifiers: Illegitimacy, Aid to families with dependent children, Medicaid, Social service, Disabled persons, Vocational rehabilitation, Child care, Prison reform.

The urban institute (UI) was awarded a grant to aid the Social and Rehabilitation Service (SRS) in developing a long-range program and financial plan, and in building a better planning capacity within the organization. In formulating researchable issues upon which to build a program-related research and development plan. UI reported on many and various issues, but there was little evidence of SRS putting the recommendations to use. Based on evaluation, it appears that two factors continue to hamper long-range changing of the political environment; and it will not seriously impact major program duties. Efforts in long-range planning achieved two significant improvements. The FY 74-78 plan will be tied to federal resources and the budget, and it will deal primarily with programs rather than bureaus, reinforcing the concept of SRS and dissipating the notion a confederation of bureaus.

PB-243 055/1GA PC$5.75/MF$2.25
Minnesota Systems Research, Inc., Minneapolis.
Assessment of Methods to Evaluate the Scientific Rigor of Social Research: A Study of Six Rehabilitation Research Projects.
Special rept.,
Willy De Geyndt, Kjell R. Knudsen, Sylvia McCollor, Jan Parkinson, and Richard Sykes.
May 73, 140p SRS-55936-014
Grant SRS-22-55936

Descriptors: *Research projects, *Rehabilitation.

The report is part of a larger study, which focused on evaluation of the technical quality or methodologic adequacy of a sample of 180 ongoing and completed research projects funded by a DHEW agency during a 3-year funding period. Six research projects were evaluated. Two basic review methods were utilized, mail review and single panel review.

PB-243 147/6GA PC$8.50/MF$2.25
Kentucky Dept. of Child Welfare, Frankfort.
Park Duvalle Day Care Center: A Descriptive Evaluation.
Final rept.,
Alan L. McElhaney, and Judith P. Archambo.
Feb 72, 257p SRS-87-80046-001
Grant SRS-87-80046
Prepared in cooperation with Kentucky Univ., Lexington, and Spindletop Research, Inc., Lexington, Ky.

Descriptors: *Day care centers, *Children, *Paraprofessional personnel.

The report is a summary of the many problems and difficulties involved in establishing a successful day care center. The report contains data and a detailed analysis of this center. The results indicate that a day care center in the center-city environment is necessary to enable low-income residents a chance to better their economic and social conditions. The report includes evaluation and suggestions concerning staff, paraprofessionals, equipment, services, facilities, and administration. The report concludes with 6 detailed appendices concerning specific problems.

6. BIOLOGICAL AND MEDICAL SCIENCES

6A. Biochemistry

AD-A012 033/7GA PC$3.25/MF$2.25
California Univ Los Angeles Space Biology Lab
Some Chemical and Electrophysiological Effects of Glutamate in Cerebral Cortex,
L. K. Kaczmarek, and W. Ross Adey. 1 Nov 73, 13p AFOSR-TR-75-0896
Contract F44620-70-C-0017
Availability: Pub. in Jnl. of Neurobiology, v5 n3 p231-241 1974.

Descriptors: *Cerebral cortex, *Glutamic acid, *Cats, *Amino acids, Biochemistry, Electrophysiology, Reprints.

AD-A012 161/6GA PC$10.00/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Behavioral Modification and Changes in Central Nervous System Biochemistry: An Annotated Bibliography (Supplement 1971-1974).
Final rept.,
Gerald A. Hudgens, William R. Holloway, Donald Suggs, Russell S. Hanson, and Neil Hettler. May 75, 369p
See also report dated Dec 71, AD-738 136.

Descriptors: *Central nervous system, *Behavior, *Biochemistry, *Neurochemistry, *Bibliographies, Brain, Memory(Psychology), Environments, Drugs, Learning, Psychotropic agents, Reviews.

The bibliography is a partially annotated compilation of 1300 references dealing with behavioral modification and related changes in the biochemical makeup of the central nervous system. The material is organized into the following cateogires: Memory transfer, environmental influence on CNS chemistry, drugs influencing learning and memory, theory and review, books, and related topics.

COM-75-10870/4GA PC$3.25
California Univ., Los Angeles. Dept. of Biology.
Characterization and Quantification of a Crustacean Lipovitellin,
William E. Fyffe, and John D. O'Connor. 26 Jun 73, 20p NOAA-75053004
Grant NOAA-2-35208
Pub. in Comparative Biochemistry and Physiology, v47B p851-867 1974.

Descriptors: *Crustacea, *Lipoproteins, Proteins, Females, Reproductive system, Ovary, Hormones, Endocrine glands, Shellfish, Arthropoda, Immunology, Chemical analysis.
Identifiers: Sea Grant program, *Lipovitellin, Procambarus, Molting, Crayfishes, Reprints.

Egg maturation in Arthropoda places enormous demands on the energy reserves of the female. In crustaceans, this problem is compounded by the energy requirements of the intermolt cycle. Endocrine coordination of the intermolt and reproductive cycles is therefore essential. This study was undertaken to demonstrate the presence of a female specific protein (FSP) in the fresh-water crayfish, Procambarus. Utilizing a recently developed acrylamide gel scanning technique, an attempt was made to correlate the FSP titres in the haemolymph and the amounts of major ovarian proteins with the state of ovarian development. The immunological relationship between the FSP and the lipovitellin was determined, along with the isolation and characterization of the latter.

N75-24310/5GA PC$3.25/MF$2.25
Chemical Lab. RVO-TNO, Rijswijk (Netherlands).
Reactivating Potency of Some Oximes Towards Phosphylated Acetylcholinesterase.
L. P. A. Dejong. 1974, 21p TDCK-65518, CL-1974-12

Descriptors: *Cholinesterase, *Inhibitors, *Organic phosphorus compounds, Enzyme activity, Imines, Neuromuscular transmission, Oxamic acids, Phosphines, Poisoning (Reaction inhibition).

For abstract, see STAR 1315

N75-24339/4GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Preferential Release of Newly Synthesized Acetylcholine by Cortex Slices from Rat Brain.
P. C. Molenaar, and R. L. Polak. 1974, 20p MBL-1974-34, TDCK-65584

Descriptors: *Acetylation, *Biosynthesis, *Cerebral cortex, *Choline, *Rats, Acetyl compounds, Cholinergics, Isotopic labeling, Synapses.

For abstract, see STAR 1315

N75-24340/2GA PC$3.75/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Purification and Characterization of an Endonuclease from Calf Thymus Acting on Irradiated DNA.
S. Bacchetti, and R. Benne. 1974, 34p MBL-1974-35, TDCK-65576
Contract EURATOM-107-72-1-BIAN

Descriptors: *Deoxyribonucleic acid, *Enzyme activity, *Nuclease, *Radiation damage, Cells (Biology), Gamma rays, Molecular weight, Radiation protection, Thymus gland, Ultraviolet radiation.

For abstract, see STAR 1315

6B. Bioengineering

N75-24522/5GA PC$7.50/MF$2.25
Texas Univ. Health Science Center, Houston.
Urban Environmental Health Applications of Remote Sensing.
M. Rush, J. Goldstein, B. P. Hsi, and C. B. Olsen. Nov 74, 245p NASA-CR-141796
Contract NAS9-12823

Descriptors: *Cities, *Public health, *Remote sensors, Aerial photography, Air pollution, Diseases, Infrared photography, Land use, Mortality.

For abstract, see STAR 1315

N75-24543/1GA PC$4.25/MF$2.25
Texas Univ., Houston. Health Science Center.
Urban Environmental Health Applications of Remote Sensing, Summary Report.
M. Rush, J. Goldstein, B. P. Hsi, and C. B. Olsen. Jan 75, 66p NASA-CR-141788
Contract NAS9-12823

Misc-Original Contains Color Illustration.

Descriptors: *Health, *Remote sensors, *Urban research, Diseases, Environmental monitoring, Mortality, Myocardial infarction, Populations, Regression analysis.

For abstract, see STAR 1315

6C. Biology

AD/A-011 974/3GA PC$3.25/MF$2.25
Naval Medical Research Unit No. 3, FPO, New York 09527.
Studies on Southeast Asian Haemaphysalis Ticks (Ixodoidea: Ixodidae). 'H. (Kaiseriana) lagrangei' Larrousse: Identity, Distribution, and Hosts.
Technical scientific rept.,
Harry Hoogstraal, Kawther M. El Kammah, Frederick J. Santana, and P. F. Dirk Van Peenen. 12 Apr 73, 16p Rept. no. NAMRU-3-TR-47-74
Availability: Pub. in Jnl. of Parasitology, v59 n6 p1118-1119 Dec 73.

Descriptors: *Ticks, Hosts(Biology), Identities, Distribution, Deer, Southeast Asia, Reprints.
Identifiers: *Haemaphysalis ticks, *Ixodoidea, *Ixodidae, H. Lagrangei Larrousse, *Haemaphysalis Kaiseriana langrangei Larrousse.

Structural variations observed within wild-caught and laboratory-reared samples attributed to Haemaphysalis (Kaiseriana) lagrangei Larrousse have made it difficult to define this species and its relationships to others in the H. (K.) bispinosa group. The type material is in a poor state of preservation. The male and female are redescribed and the nymph and larva are described. Adults from the sambar deer are generally larger in size than those from the barking deer and small carnivores (ferret-badgers, and various civets and mongooses). Structural differences in various population samples are described. This forest-inhabiting species is common in Vietnam and Cambodia and also occurs in Thailand and the Malay Peninsula.

AD-A011 870/3GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Automation of Microstereology. The Development of a Biological Test System for Evaluating the Performance of Computer-Controller Optical Scanners.
Final rept.,
Ronald S. Weinstein, Michael G. Cedars, and Jonathan S. Wallach. Dec 74, 12p Rept no. AMRL-TR-74-125-Paper-21
Prepared in cooperation with Tufts Univ., Boston, Mass. School of Medicine.

Descriptors: *Erythrocytes, *Cells(Biology), *Electron microscopy, Volume, Optical images, Cytology, Optical scanning, Computer applications, Test methods.
Identifiers: Stereoscopy.

A method is described that can be used to prepare a biological test object, the human RBC, for thin section electron microscopy. Red cells are randomly and relatively uniformly distributed in the RBC-agar gels prepared according to this method. The cells are of reasonably high contrast and preliminary testing indicates that these films of RBC-agar blocks are suitable for use in a computer-controlled optical scanner, thus satisfying our technical objective. The microstereology data human RBCs that were developed in the the course of this study are of considerable general interest. Estimates of RBC mass cell volume and surface areas are of considerable importance since these values are used in studies dealing with a broad spectrum of problems in cell biology, biophysics and biochemistry (Weinstein, 1974). Many investigators have attempted to determine these RBC dimensions by other methods and some of these results are summarized.

AD-A011 973/5GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 New York 09527
The Haemaphysalis Ticks (Ixodoidea: Ixodidae) of Birds. 3. 'H. (Ornith0-Physalis)' Subgen. N.: Definition, Species, Hosts, and Distribution in the Oriental, Palearctic, Malagasy, and Ethiopian Faunal Regions.
Technical scientific rept.,
Harry Hoogstraal, and Hilda Y. Wassef. 9 Jul 73, 22p Rept no. NAMRU-3-TR-46-74
Availability: Pub. in Jnl. of Parasitology, v59 n6 p1099-1117 Dec 73.

Descriptors: *Ticks, *Birds, Hosts(Biology), Distribution, Definitions, Ethiopia, Southeast Asia, Reprints.
Identifiers: *Haemaphysalis ticks, *Ixodoidea, *Ixodidae, H. Ornithophysalis, Palearctic region, Malagasy region.

The 18 known species in the newly defined haemaphysalid subgenus Ornithophysalis represent the phylogenetic branch from which the numerous (ca. 30) mammal-parasitizing species of the subgenus Rhipistoma Koch have apparently evolved. Birds are characteristic hosts of most Ornithophysalis species; some parasitize birds and mammals. The subgenus is divided into five structural-biological groups of species: H. (O.) doenitzi group: doenitzi, undescribed sp., madagascariensis, hoodi; chiefly birds; Oriental and Australian, Palearctic, Malagasy, and Ethiopian Faunal Regions, respectively. H. (O.) simplex group: simplex, taufflebi, megalaimae, minuta, bandicota, sciuri; birds and/or mammals; Oriental, Malagasy, Ethiopian. H. (O). verticalis group: verticalis, Oriental (NE China), mammals. H. (O.) ornithophila group: ornithophila, howletti; birds and mammals, Oriental. H. (O.) humerosa group: ratti, humerosa, bremneri, petrogalis, lagostrophi; birds and/or mamals; Australia-New Guinea. The type species of the subgenus is H. (O.) doenitzi Warburton and Nuttall, 1909. Junior synonyms of doenitzi are centropi Kohls, 1949, and weidneri Santos Dias, 1958. H. pavovskyi Pospelova-Shtrom of Tadzhik SSR also appears to be a junior synonym. Recorded are the typical and the variable structural characteristics of adult and immature doenitzi samples from Sri Lanka (Ceylon), India, southern Nepal, Burma, Laos, southern China, Hong Kong, Taiwan, Philippines, Thailand, the Malay Peninsula, Singapore (type locality), Borneo, New Guinea, and northeastern Australia.

AD-A012 031/1GA PC$3.25/MF$2.25
California Univ Los Angeles
Retinal Ganglion Cells of the Cat Transfer Information on Saccadic Eye Movement and Quick Target Motion,
Hiroharu Noda, and W. Ross Adey. 8 Jan 74, 8p AFOSR-TR-75-0895
Contract F44620-70-C-0017, Grant PHS-1-R01-EY01051-01A1
Availability: Pub. in Brain Research, v70 p340-345 1974.

Descriptors: *Retina, *Eye, *Cats, *Ganglia, Motion, Reprints.

In the present study the investigators searched for retinal ganglion cells that were transiently excited by saccades in chronically prepared cats. As excitability of LGN cells was suppressed during quick image motion by signals arising in the retina it was assumed that the information might be coded in a burst discharge which would continue for a period comparable to the initial portion of the suppression. It was found that there were at least three classes of ganglion cells in the cat retina that differed in their discharge patterns relating to eye movements scanning a stationary grating pattern. One class of cells showed transient bursts to eye movements and another class of cells showed sustained discharges in certain directions of gaze, reflecting local luminance. There were also cells showing both transient and sustained responses. (Author)

AD-A012 039/4GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 Fpo New York 09527
Mystromys Albicaudatus, the African White-Tailed Rat as an Experimental Host for Leishmania Donovani.
Technical rept.,
J. W. Mikhail, and N. S. Mansour. 31 Jan 73, 6p Rept no. NAMRU-3-TR-49-74
Availability: Pub. in Jnl. of Parasitology, v59 n6 p1085-1087 Dec 73.

Descriptors: *Rats, *Hosts(Biology), Leishmania, Laboratory animals, Comparison, Parasites, Survival(General), Leishmaniasis, Spleen, Liver, Reprints.
Identifiers: Mystromys albicaudatus, Leishmania donovani, Mesocricetus auratus.

The course of Leishmania donovani infection was studied in the African white-tailed rat, Mystromys albicaudatus, and compared with that in the golden hamster, Mesocricetus auratus. All hamsters died at about 40 days postinoculation but the white-tailed rat survived with high levels of parasites for more than a year with no apparent ill effects or tendency to spontaneous recovery. The easily bred, long-lived white-tailed rat is an excellent experimental host for in vivo maintenance and long-term experiments with L. donovani. (Author)

AD-A012 120/2GA PC$3.25/MF$2.25
Seattle Univ Wash Dept of Chemistry
Molecular Basis for Formation of Lipid Sound Lens in Echolocating Cetaceans,
Usha Varamasi, Henry R. Feldman, and Donald C. Malins. 6 Feb 75, 3p
Availability: Pub. in Nature, v255 n5506 p340-343, 22 May 75.

Descriptors: *Lipids, *Lenses, *Sound, *Whales, *Porpoises, Echoes, Molecular structure, Acoustic properties, Cetacea, Reprints.

AD-A012 129/3GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Veterinary Science
'Lutzomyia Cirrita' N. SP. from Colombia with a New Synonym in the Genus (Diptera: Psychodidae: Phlebotominae),
David G. Young, and Charles H. Porter. 1974, 6p AFOSR-TR-75-0765
Contract DADA17-72-C-2139, Grant AF-AFOSR-1455-68
Availability: Pub. in The Florida Entomologist, v57 n3 p321-325 1974.

Descriptors: *Winged insects, *Entomology, Humans, Bites and stings, Colombia, Reprints.
Identifiers: Lutzomyia cirrita, Sand flies.

During examination of Phlebotomine sand flies from the Rio Anori Valley, antioquia Dep., Colombia, an undescribed, rather uncommon species related to Lutzomyia peruensis (shann.) was found usually in human biting collections. The male and female of L. cirrita n. sp. are described and illustrated in order to make the name available for a forthcoming paper dealing with population dynamics of sand flies in the Rio Anori area. (Author)

COM-75-10891/0GA PC$3.25/MF$2.25
Washington State Dept. of Fisheries, Olympia.
Skykomish Salmon Channel Construction.
Completion rept. Mar 72-Jun 75. Mar 75, 12p NOAA-75061204

Report on Anadromous Fish Conservation Act.

Descriptors: *Salmon, *Fisheries, *Fishing grounds, Channel improvements, Construction, Estuaries, Wallace River, May Creek, Washington(State).

The Skykomish Salmon Channel project was undertaken with the objective of providing natural and/or artificial spawning for pink and chum salmon with additional coho and chinook rearing. The channel was constructed adjacent to the existing Department of Fisheries hatchery on May Creek, a Wallace River (WA) tributary. It was designed to get maximum usable spawning and incubating area for pink and chum salmon that the land area, configuration, financing, and water supply would allow. Also, the channel and associated water supply system was designed to enable a substantial increase in chinook and/or coho production during the time of year, April through September, that pink or chum would not be utilizing the facilities.

COM-75-10892/8GA PC$3.25/MF$2.25
South Dakota Dept. of Game, Fish and Parks, Pierre.
Commercial Fish Industry Survey, South Dakota.
Completion rept. Jan 66-Jun 72,
Donald C. Warnick. May 73, 15p NOAA-75061201
Report on Commercial Fisheries Research and Development Act.

Descriptors: *Fish industry, *Commercial fishing, *South Dakota, Surveys, Fish harvesting, Tables(Data), Minnows, Seafood, Frogs, Fishing, Statistical data.
Identifiers: Baitfish.

The objective of the study was to develop a continuous survey system for the collection of commercial fishery statistics in South Dakota. Commercial fishery supervisors accompanying contract fishermen collected basic data related to fishing effort and catches of each species. Periodic advisory visits were made by the principal investigator to assure continuity and conformity in data recording on standardized forms for each day of fishing. Data from daily report forms were totalled monthly for each lake and recorded on a monthly summary form. The findings of such data on food fish, baitfish, and frogs are presented in this completion report.

COM-75-10893/6GA PC$3.25/MF$2.25
State Univ. of New York, Syracuse. Coll. of Environmental Science and Forestry.
Papermaking Potential of Zostera and Cladophora, Two Marine Weeds,
Bengt Leopold, and Renata Marton. Feb 74, 13p NYSSGP-RS-75-009 NOAA-75060507
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant.

Descriptors: *Aquatic weeds, *Papermaking, Pulping, Oxygen, Paper industry, Bleaching, Algae, Marine biology, Harvesting, Cellulose, Grasses, Chlorine oxides, Sodium hydroxide, Tear strength.
Identifiers: Sea Grant program, *Zostera, *Cladophora, Chlorine dioxide.

An oxygen pulping method converted Zostera and Cladophora to usable pulps. A usable Cladophora pulp was also made in over 70% yield by a simple alkali treatment. The pulps could be bleached fairly easily with hypochlorite and/or chlorine dioxide. Pulp strength was low, and the only promising use found was as an additive to newsprint or corrugating medium and board.

COM-75-10894/4GA PC$3.75/MF$2.25
Hawaii Univ., Honolulu. Sea Grant Program.
Makahiki Kai '75: Festival of the Sea, Student Workbook, April 15-18, 1975.
1975, 33p NOAA-75061101

Descriptors: *Marine resources, *Ocean environments, *Marine biology, *Instructions, Grants, Aquatic animals, Fishing, Aquaculture, Fishing equipment, Fishes, Hawaii.
Identifiers: Sea Grant program, Makahiki Kai, Instructional materials.

The booklet was designed as a guide for children attending Makahiki Kai '75, April 15-18, 1975, at the Honolulu International Center. It contains an explanation of the College Sea Grant Program, information for participants concerning the various exhibits and activities included in this festival, and related puzzles and quizzes.

COM-75-10898/5GA PC$3.25
Delaware Univ., Lewes. Coll. of Marine Studies.
Comparison of Rotifers and Other Diets for Rearing Early Larvae of the Blue Crab, 'Callinectes sapidus' Rathbun,
Stephen D. Sulkin, and Charles E. Epifanio. 8 Aug 74, 7p Contrib-101, DEL-SG-7-75 NOAA-75061104
Grants NOAA-04-3-043-48, NOAA-2-35223
Also pub. as Maryland Univ., Solomons. Natural Resources Inst. Contrib. 591. Pub. in Estuarine and Coastal Marine Science, v3 p109-113 1975.

Descriptors: *Crabs, *Shrimps, *Sea urchins, *Diets, Larvae, Survival, Aquaculture, Mortality, Food habits.
Identifiers: Reprints, Callinectes sapidus, Artemia salina, Lytechinus variegatus, Brachionus plicatilis, Sea Grant program.

The following four diet treatments were applied to the first two zoeal stages of the blue crab, Callinectes sapidus Rathbun: (1) Unfed control, (2) freshly-hatched nauplii of the brine shrimp Artemia salina, (3) gastrulae of the sea urchin Lytechinus variegatus Lamarck, and (4) the rotifer Brachionus plicatilis Muller. Survival and molt frequency were measured through the second molt. Unfed crab larvae died the seventh day without molting to the second stage. Mortality was delayed slightly in larvae fed A. salina nauplii but molting to the second zoeal stage was not achieved. Development to the third zoeal stage was achieved using both sea urchin larvae and rotifers as diets. Survival was higher on the rotifer diet than on either the sea urchin diet used in this study or on other published diets. Molting to the second zoeal was significantly faster on the rotifer diet than on the sea urchin diet and was more synchronous.

COM-75-10906/6GA PC$5.75/MF$2.25
Hawaii Univ., Honolulu. Sea Grant Program.
Environmental Factors Affecting Stress and Mortality of the Hawaiian Anchovy in Captivity.
Technical rept.,
Jeannette Whipple Struhsaker, Wayne J. Baldwin, and Garth I. Murphy. Feb 75, 131p UNIHI-SEAGRANT-TR-75-02 NOAA-75061106
Grants NOAA-2-35243, NSF-GH-93

Descriptors: *Fishes, *Fishing, *Fisheries, Mortality, Salinity, Aeration, Temperature, Light(Visible radiation), Color, Animal behavior, Feeding stuffs, Survival, Animal diseases, Hawaii.
Identifiers: *Stolephorus purpureus, *Baitfish, Sea Grant program, Predation.

Nehu (Stolephorus purpureus) is the primary baitfish in the Hawaiian skipjack tuna fishery. The purpose of this study was to increase fishing efficiency by reducing baitfish mortality and time spent baiting. The following biological and technicological factors were examined for their effect on nehu mortality: Salinity, aeration, oxygen, temperature, current, light, tank color, recirculated reduced salinity, buffers, protein skimmer, density, food, disease, and predation. Time of bait capture (night or day) was also examined. A study of these factors and their effect on survival was made during capture and transfer to bait wells, in experimental laboratory tanks, in bait wells on an experimental barge, and in bait wells of commercial vessels while at sea. Results of these studies were applied in designing and testing improved live bait holding facilities.

COM-75-10910/8GA PC$6.25/MF$2.25
Delaware Univ., Newark. Coll. of Marine Studies.
Seed-Bearing Halophytes as Food Plants: Proceedings of a Conference Held at University of Delaware on June 10-11, 1974,
G. Fred Somers. Feb 75, 154p* DEL-SG-3-75 NOAA-75061105
Grant NOAA-2-35223

Descriptors: *Plants(Botany), *Saline soils, *Food supply, *Meetings, Rice plants, Sea grasses, Habitability, Salinity, Plant growth, Seeds, Acclimatization, Feasibility, Plant metabolism, Swamps.
Identifiers: Sea Grant program, Halophytes, Spartina alterniflora, Distichlis spicata, Zostera marina, Prunus maritima, Lathyrus maritimus.

The report presents proceedings of a conference on the possibility of using seed-bearing halophytes as food sources for man and domesticated animals. Contributions cover such subjects as domestication of wild rice, use of seagrasses and terrestrial halophytes as food plants, adaptation of present crops to saline habitats, and problems in managing saline soils. Also included are results of associated workshop studies. The consensus of the conferees is that development of seed-bearing halophytes would be feasible given sufficient funding and that it represents a worthwhile goal.

COM-75-10914/0GA PC$4.25/MF$2.25
Delaware State Dept. of Natural Resources and Environmental Control, Dover.
Live Oyster Bed and Cultch Survey of the Delaware Bay and Tributaries.
Completion rept. Feb 71-Dec 74,
Robert A. Beck, and Richard W. Cole. Apr 75, 55p NOAA-75061203
Report on Commercial Fisheries Research and Development Act.

Descriptors: *Oysters, *Estuaries, *Delaware Bay, Fishing grounds, Reproduction(Biology), Survival, Parasites, Surveys, Protozoa.
Identifiers: Minchinia nelsoni.

Delaware's natural seed oyster beds, totalling 972 acres, were surveyed and charted, as well as oyster beds located in tidal tributaries. Bi-annual oyster samples were collected and examined for the protozoan parasite Minchinia nelsoni (MSX). Infection rates have decreased on the natural beds, however, the rate of infections remains consistently high on the leased beds. In general, Delaware oyster landings show a steady increase up until 1972. Since then, the lack of sufficient seed oysters has reduced landings. Successful, reproduction and survival apparently are the major problems affecting Delaware's natural oyster beds production.

COM-75-10915/7GA PC$3.25/MF$2.25
Maine State Dept. of Marine Resources, Augusta.
Fishway Construction and Stream Improvement.
Completion rept. Jun 71-Jan 75,
Lewis N. Flagg. Mar 75, 14p NOAA-75061202
Report on the Anadromous Fish Conservation Act.

Descriptors: *Fishways, *Fishing grounds, *Fishes, Dams, Construction, Streams, Lakes, Maine.
Identifiers: Alewives.

The utilization of Maine's water resources during the past two hundred years has been extremely detrimental to anadromous fish. There are 1,061 dams on Maine's freshwater streams and rivers, but only 105, or 10% of these structures have fishways. Many of these obstructions, because they are located at head of tide, have completely eliminated anadromous runs in certain watersheds. The development of fish passage facilities, coupled with water pollution abatement programs, has demonstrated tangible results in restoration of these resources in selected watersheds. Under this project, four fishways have been constructed and one obstruction has been removed, providing access to 18.4 miles of streams and 2,635 acres of lake habitat.

N75-24295/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Several Question of the Phylogeny and System of Lacertilia (Seu Sauria).
V. B. Sukhanov. May 73, 20p NASA-TT-F-16354
Contract NASW-2483
Tran-Transl. Into English from Zool. Zh. (Ussr), V. 40, No. 1, 1961 p 73-83.

Descriptors: *Biogeny, *Lizards, *Morphology, Biological evolution, Locomotion, Muscular function, Musculoskeletal system, Reptiles, Taxonomy.

For abstract, see STAR 1315

N75-24321/2GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Biological Experiments on Salyut-4.
25 Apr 75, 29p NASA-TT-F-16267
Contract NASW-2483
Tran-Transl. Into English from Russian Reports.

Descriptors: *Biological effects, *Microbiology, *U.s.s.r. space program, Bacillus, Human factors engineering, Spacecraft environments, Vegetation growth, Weightlessness.

For abstract, see STAR 1315

N75-24338/6GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
The Innervation of Chick Striated Muscle Fibres by the Chick Ciliary Ganglion in Tissue Culture.
J. Hooisma, D. W. Slaaf, E. Meeter, and W. F. Stevens. 1974, 14p MBL-1974-33, TDCK-65577
Subm-Sponsored in Part by Found. Promeso and Found. For Med. Res. Fungo.

Descriptors: *Biological evolution, *Chickens, *Ganglia, *Muscles, *Striation, *Synapses, Cholinergics, Electrophysiology, Leg (Anatomy), Neuromuscular transmission, Pharmacology, Tissues (Biology).

For abstract, see STAR 1315

PAT-APPL-510 974/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
A Machine to Fill Insect Rearing Cells with Diet.
Patent Application,
Edsel A. Harrell, Alton N. Sparks, William D. Perins, and Woodrow W. Hare. Filed 1 Oct 74, 10p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Volume unit meters, *Diets, *Insects, *Patent applications, Food dispensing, Pneumatic cylinders, Pressure, Calibrating, Viscosity.

The patent application describes a new apparatus and method for metering insect diet accurately and efficiently into individual insect rearing cells. Insect diet is accurately metered into a set of plastic rearing cells which are preformed by a form-fill-seal machine. The insect diet is transferred from a thermally controlled reservoir through a pneumatic cylinder type metering device by means of a negative pressure on the intake and a positive pressure on the discharge. Thus very high viscosity diet materials can be utilized.

PB-242 746/6GA PC$5.25/MF$2.25
Minnesota Univ., St. Paul. Dept. of Entomology, Fisheries and Wildlife.
Temperature Effects on Eggs and Fry of Percold Fishes.
Final rept.,
Lloyd L. Smith, Jr., and Walter M. Koenst. May 75, 102p EPA/660/3-75-017
Grant EPA-R-800704
Paper copy also available from GPO as SN-055-001-01018.

Descriptors: *Fishes, *Tolerances(Physiology), *Growth, Heat tolerance, Eggs, Larvae, Acclimatization, Survival, Reproduction(Biology), Mortality.
Identifiers: Stizostedion vitreum, Stizostedion canadense.

Temperature effects on the early life history stages of the walleye (Stizostedion vitreum vitreum) and sauger (Stizostedion canadense) were examined. Walleye eggs and fry were exposed to six temperatures (6-21C) for effects on fertilization, incubation, and fry survival. Mature sauger were held and eggs were fertilized at four temperatures (9-18C). Both species were incubated at 6-21C. Sauger fry survival was also tested at 6-21C. Optimum fertilization temperatures were 6-12C for walleye and 9-15C for sauger. Optimum incubation temperatures were 12-15C for both walleye and sauger. A sharp drop or rise in temperature had no great effect on walleye fry and juvenile survival except when the upper lethal or lower lethal temperature was approached. Optimum temperature for juvenile walleye and sauger growth was 22C.

6D. Bionics

AD-A012 392/7GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
On the Purpose of Low-Level Vision,
David Marr. Dec 74, 31p Rept no. AI-M-324
Contract N00014-70-A-0362-0005

Descriptors: *Information processing, *Visual signals, Low level, Symbols, Arrays, Images, Visual perception.
Identifiers: *Visual information processing.

The article advances the thesis that the purpose of low-level vision is to encode symbolically all of the useful information contained in an intensity array, using a vocabulary of very low-level symbols. Subsequent processes should have access only to this symbolic description. The reason is one of computational expediency. It allows the low-level processes to run almost autonomously; and it greatly simplifies the application of criteria to an image, whose representation in terms of conditions on the initial intensities, or on simple measurements made from them, is very cumbersome.

6E. Clinical Medicine

AD-A011 795/2GA PC$3.25/MF$2.25
Texas Univ At Austin Electronics Research Center
Temperature Rise Required for Production of Minimal Lesions in the 'Macaca mulatta' Retina,
Leslie A. Priebe, C. P. Cain, and A. J. Welch. 1974, 9p AFOSR-TR-75-0915
Contracts F44620-71-C-0091, F41609-73-C-0031
Availability: Pub. in American Jnl. of Ophthalmology, v79 n3 p405-413 Mar 75.

Descriptors: *Retina, *Lesions, Temperature, Rhesus monkeys, Gas lasers, Thresholds(Physiology), Measurement, Reprints.
Identifiers: Macaca mulatta.

This study provides a starting point for the formation of a model which describes the rate process of temperature rise in the light irradiated eye and which would allow to assess threshold levels for tolerable laser irradiation. Fundus temperatures of the rhesus monkey were measured with argon laser (488 nm) irradiations that produced minimal, ophthalmoscopically visible lesions five minutes after exposure. Measurements were made with 10- to 20- tip diameter, copper-nickel thermocouples. Preliminary data included measurements at eight paramacular sites and seven macular sites. The threshold temperature rise was 17 to 26 C for a ten-second exposure at these sites. Decreasing the exposure duration to 20 msec increased the threshold temperature rise range to the interval between 30 and 40 C. The temperature measurements in the eye were compared to a computer solution of the heat conduction equation. (Author)

AD-A011 869/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Relevance of Mutagenesis to Carcinogenesis.
Final rept.,
Marvin S. Legator. Dec 74, 18p Rept no. AMRL-TR-74-125-Paper-20
Prepared in cooperation with Brown Univ., Providence, R.I.

Descriptors: *Carcinogens, *Mutagens, *Genetics, Mutations, Cancer, Molecular biology, Detection, Test methods, Chemical compounds, Bioassay, Laboratory animals, In vitro analysis, In vivo analysis.
Identifiers: *Cytogenetics.

The development of a strong correlation between mutagenic agents and carcinogenic compounds is a direct consequence of the ability to determine both effects in mammalian systems. Prior to the development of mammalian tests for mutagenicity, mutagenic agents were evaluated for carcinogenicity in rodents. The major exceptions that were previously found for carcinogens not being mutagenic have been for the most part resolved by the use of rodents for testing both types of activity. Carcinogenic compounds such as cycasin and nitrosamines, which are not mutagenic when tested directly on bacteria, are now known to be mutagenic as well as carcinogenic. Procedures such as the host-mediated assay have contributed greatly to the establishment of a qualitative correlation between carcinogenic and mutagenic compounds. The use of available mammalian tests for mutagenicity should identify carcinogenic compounds in a fraction of the time needed for the conventional carcinogenic assay.

AD-A011 871/1GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio

Use of Computers in Diagnostic Pathology in Laboratory Medicine.
Final rept.,
P. W. Neurath, R. S. Weinstein, and W. D. Selles.
Dec 74, 15p Rept no. AMRL-TR-74-125-Paper-22
Prepared in cooperation with New England Medical Center Hospital, Boston, Mass.

Descriptors: *Pathology, *Pattern recognition, Medical laboratories, Computer applications, Optical scanning, Optical images.
Identifiers: *Medical computer applications, Histopathology.

The ever increasing need for accurate, large scale laboratory measurements of microscopic specimens is expected to stimulate the application of computer techniques to any routine which is or becomes widely used. To facilitate such applications in the future, research in computerized measuring techniques and pattern recognition algorithms, as well as in hardware for scanning and computing, needs to be performed. One way to make sure that this research gets done, and that its results will be readily usable in the pathology laboratory is to have a few pathologists become actively and intimately involved with it.

AD-A011 920/6GA PC$3.75/MF$2.25
American Dental Association Health Foundation Chicago Ill Research Inst
Stress Biophysics.
Final rept. 1 Nov 72-31 Apr 75,
Kirk C. Hoerman. 15 Jun 75, 36p Rept no. ADAHF-RI-03.126
Contract N00014-73-C-0126

Descriptors: *Connective tissue, *Tissues(Biology), *Molecular biology, *Fluorometers, Chemical analysis, Phosphorescence, Collagen, Proteins, Polysaccharides, Histology, Bones, Cartilage, Measuring instruments.
Identifiers: Proteoglycans, Glycans.

A fully compensated spectrophotofluorimeter, built by the University of Nottingham, England under ONR contract in 1969, was configured to accommodate biological specimens at liquid nitrogen and helium temperatures. The reliability and reproducibility of data obtained due to compensation of all adverse variables in the instrument was assessed. Preliminary information was obtained on the nature of the electron excited state (phosphorescence) in certain molecular domains of connective tissues. The system of measurement was adapted to quantifying the two main molecules of tendon, namely, collagen and proteoglycan simultaneously without chemical disruption. The effort lead to development of a method for assessing the effects of aging and nutrition on the molecular nature of connective tissues.

AD-A011 960/2GA PC$3.75/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
A Comparison of Thermal and RF Exposure Effects on Trace Metal Content of Blood Plasma and Liver Cell Fractions of Rodents,
James W. Frazer, Ted D. Rupp, and John L. Montet. 1974, 13p Rept no. SAM-TR-74-225
Presented at the Conference on the Biological Effects of Non-Ionizing Radiation.
Availability: Pub. in Annals of the New York Academy of Sciences, v247 p282-291, 28 Feb 75.

Descriptors: *Thermal stresses, *Radiofrequency, *Biochemistry, *Trace elements, *Iron, Metals, Stress(Physiology), Rats, Blood plasma, Liver, Reprints.

Male sprague Dawley rats were exposed to a thermal environment sufficient to raise their body temperature to 45 C. and several intermediate temperatures. It was found that plasma iron concentration increased nearly linearly when body temperature exceeded 42 C.; Mg, Ca, and Zn did not increase uniformly. Similar results were obtained when the USAFSAM RF exposure device was especially altered to allow conductive RF currents at 26 MHz to occur within the animal producing temperature changes equivalent to those thermally produced. Absorbed powers of 16 watts/kg. were used. Much of the change in plasma iron could be shown to be as a result of loss from the soluble fraction of liver. There was also a marked loss of Zn from this fraction. Loss of Mg 2+ from mitochondria was indicated. Since such metals usually occur complexed to other materials, such as nucleotides, the thermal component of RF power absorption is expected to cause several wide-ranging biochemical alterations which should serve as biological indicators of power absorption. (Author)

AD-A011 961/0GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Trace Composition of Human Respiratory Gas.
Progress rept. 1 Jul 71-31 Mar 73,
James P. Conkle, Bennie J. Camp, and Billy E. Welch. 15 Nov 74, 7p Rept no. SAM-TR-74-358
Availability: Pub. in The Archives of Environmental Health, v30 p290-295 Jun 75.

Descriptors: *Trace gases, *Respiration, *Organic compounds, *Humans, Diagnosis(medicine), Metabolic diseases, Industrial medicine, Environments, Chemical analysis, Sampling, Cryogenics, Reprints.

A multi stage cryogenic trapping system was used to sample and concentrate trace organic constituents in human respiratory gas. Chemical analysis was conducted by gas chromatography and mass spectrometry. Respiratory compound identification and production rate data are shown for 8 human test subjects. The use of the sampling technic for diagnosis of metabolic disease and industrial exposure applications is discussed. (Author)

AD-A011 962/8GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Empirical Studies of Cardiac Pacemaker Interference.
Technical paper Aug 72-Apr 73,
John C. Mitchell, Willian D. Hurt, William H. Walter, III, and James K. Miller. 1973, 9p Rept no. SAM-TR-73-304
Availability: Pub. in Aerospace Medicine, v45 n2 p189-195 Feb 74.

Descriptors: *Cardiac pacemakers, *Electromagnetic interference, *Radiation effects, Radar, Radiofrequency interference, Implantation, Simulation, Reprints.

To evaluate the relative susceptibility of cardiac pacemakers to electromagnetic radiation interference, tests were conducted at several representative radar sites in the United States. The 21 pacemakers, of different types and manufacture, were evaluated in a free-field configuration as well as in a saline solution phantom (implantation simulation). Test results are presented for five frequency bands between 200 and 6,000 MHz. Many pacemakers skipped one or two beats when the main beam of the radars scanned past the point of closest approach. This effect, observed regularly for some pacemakers at distances out to a mile or more from the radar, might result in a pacemaker patient losing a normal heartbeat every 10-12 sec (about 5-6 beats per minute). Although this interference is not considered a threat to life, the effect can become more serious for a patient closer to the radar--depending on the particular pacemaker in use, the state of the patient's health, and the activity in which he is involved. (Author)

AD-A011 963/6GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Arterial Blood Gases in Conscious Rats Exposed to Hypoxia, Hypercapnia or Both.
Final rept. Jun 72-Jan 73,
William E. Pepelko, and Gene A. Dixon. 10 Apr 74, 8p Rept no. SAM-TR-14-293
Availability: Pub. in Jnl. of Applied Physiology, v38 n4 p581-587 Apr 75.

Descriptors: *Blood gases, *Arteries, *Rats, *Hypoxia, *Hypercapnia, pH factor, Oxygen, Carbon monoxide, Pressure, Consciousness, Reprints.

Adult male rats were anesthetized and catheters were implanted in the caudal artery. Soon after recovery from short lasting anesthesia a total of 20 groups of 6 each were individually exposed to 5 different oxygen levels varying from 21.0% to 8.9% combined with 4 CO2 levels ranging from 0 to 12.9% at a mean barometric pressure of 744 torr. Arterial blood samples were collected and analyzed for pH, P sub O2 and P sub CO2 before and near the end of 20 minute exposures.

AD-A011 971/9GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 Fpo New York 09527
Urinary Schistosomiasis in Egypt: Clinical, Radiological, Bacteriological and Parasitological Correlations.
Technical scientific rept.,
J. S. Lehman, Jr., Z. Farid, J. H. Smith, S. Bassily, and N. A. El-Masry. 1973, 19p Rept no. NAMRU-3-TR-43-74
Availability: Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v67 n3 p384-399 1973.

Descriptors: *Urinary system, *Schistosomiasis, Clinical medicine, Radiology, Bacteriology, Parasites, Males, Egypt, Kidneys, Therapy, Reprints.

Two-hundred Egyptian boys and men with urinary schistosomiasis were studied by clinical evaluation, radiography, quantitative egg excretion bacterial cultures, and tests of renal function. Results were analysed by age, by symptoms (clinical grade), by presence of polypoid vs calcified schistosomal lesions (radiological stage), by presence or absence of obstructive uropathy, and by response to antischistosomal treatment.

AD-A012 030/3GA PC$3.25/MF$2.25
California Univ Los Angeles Space Biology Lab
Contamination of Scalp EEG-Spectrum During Contraction of Cranio-Facial Muscles,
Robert D. O'Donnell, Jan Berkhout, and W. Ross Adey. 29 Jan 74, 9p AFOSR-TR-75-0897
Contract F44620-70-C-0017
Availability: Pub. in Electroencephalography and Clinical Neurophysiology, v37 p145-151 1974.

Descriptors: *Electroencephalography, *Muscles, *Contraction, Spectra, Head(Anatomy), Face(Anatomy), Reprints.

Auto spectral and coherence values were determined for three EEG derivations, two cranio-facial muscles, and the biceps during separate 90 sec periods of strong contraction. Spectra of contracting frontalis and masseter muscles showed peak power between 30 and 60 c/sec, with peak biceps power during contraction centered around 50 c/sec. Over the course of contraction, all three muscles showed an increase in the proportion of low frequency power above (below 40 c/sec) and a decrease in power above the frequency. During contraction of the cranio-facial muscles, there generalized increases in EEG power at all frequencies from vertex-frontal, vertex-mastoid and vertex-temporal derivations. However, these increases

were minimal below about 14 c/sec unless one electrode of a derivation was located directly over the contracting muscle. Coherences between EEG derivations showed considerable increases during muscle contraction only at frequencies above 14 c/sec. In addition, coherence between EEG and EMG derivations were large only when one EEG electrode was located over the muscle. These results indicate that there is very little direct, linear EMG infiltration of the EEG signal below 14 c/sec during tonic contraction of individual muscles unless the EEG electrode is extremely close to a contracting muscle. (Author)

AD-A012 040/2GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 Fpo New York 09527
Interaction of Salmonellae and Schistosomes in Host-Parasite Relations.
Technical scientific rept.,
Stuart W. Young, Gene Higashi, Rifaat Kamel, Ali Zein El Abdin, and Isis A. Mikhail. 1973, 10p Rept no. NAMRU-3-TR-51-74
Availability: Pub. in Transactions of the Royal Society of Tropical Medicine and Hygiene, v69 n6 p797-802 1973.

Descriptors: *Salmonella, *Schistosoma, Interactions, Parasites, Hosts(Biology), Salmonella paratyphi, Schistosoma mansoni, Schistosomiasis, Fluorescent antibody techniques, Filtration, Reprints.

Salmonella paratyphi A were cultured from the tegument of Schistosoma mansoni after the worms were filtered from 2 patients with naturally occurring chronic Salmonella paratyphia A infection. Examination by immunofluorescence microscopy of the S. mansoni revealed S. paratyphi A colonies on and within the surface tissues of the schistosomes. To further define and establish this relationship a series of laboratory experiments were conducted and subsequently S. paratyphi A were also cultured from the tegument of schistosomes (1) after the bacteria were incubated with the S. mansoni in vitro; and (2) following recovery of the worms from mice previously inoculated with the salmonella. In addition, in the presence of S. mansoni, S. paratyphi A was shown to be protected from the bactericidal effects of ampicillin in vitro. This bacteria-host-parasite interaction may in part explain why Salmonella paratyphi A infection and schistosomiasis clinically occur frequently together and present such a difficult therapeutic problem. (Author)

AD-A012 041/0GA PC$3.25/MF$2.25
School of Aerospace Medicine Brook AFB Tex
Wolff-Parkinson-White Syndrom visited: A Review,
Michael R. Longo, Jr., and Jar .indred. 1975, 6p Rept no. SAM-TR-74-4
Availability: Pub. in Military Medicine, v140 n5 p325-328 May 75.

Descriptors: *Arrhythmia, Tachycardia, Electrocardiography, Clinical medicine, Morbidity, Physiology, Pathogenesis, Mortality rates, Therapy, Reprints.
Identifiers: *Wolff-Parkinson-White syndrome, Paroxysmal arrhythmias, Pre-excitation syndrome.

The classical features of WPW anomaly and syndrome are presented with current theories of the pathophysiology. The morbidity, mortality and treatment are discussed and a representative case history is presented and discussed. (Author)

AD-A012 043/6GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Effect of Ambient Temperature on Heat Production and Heat Loss in Burn Patients,
Douglas W. Wilmore, Arthur D. Mason, Jr., David W. Johnson, and Basil A. Pruitt, Jr. 4 Mar 74, 6p
Availability: Pub. in Jnl. of Applied Physiology, v38 n4 p593-597 Apr 75.

Descriptors: *Burns(Injuries), *Hypermetabolism, *Metabolism, *Temperature, Water, Losses, Evaporation, Reprints.
Identifiers: Ambient temperature.

Four controls and eight burned patients with thermal injury ranging from 7 to 84% total body surface were studied in an environmental chamber at 25 and 33 C ambient temperature and a constant vapor pressure during two consecutive 24-h periods. Hypermetabolism was present in the burn patients in both ambient temperatures and core and skin temperatures were consistently higher than in the normal men despite increased evaporative water loss. The higher environmental temperature decreased metabolic rate in patients with large thermal injuries in whom the decrement in dry heat loss produced by higher ambient temperature exceeded the increase of wet heat loss. In patients with burns smaller tham 60%, these changes equaled one another and higher environmental temperature exerted no effect on metabolic rate. Core-skin heat conductivity increased with burn size; patients with large burns were characterized by inadequate core-skin insulation when exposed to the cooler environment, necessitating the compensatory increase of metabolic rate. This increase, however, was small.

AD-A012 044/4GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Acute Duodenitis and Duodenal Ulceration After Burns, Clinical and Pathological Characteristics,
Albert J. Czaja, Joseph C. McAlhany, and Basil A. Pruitt, Jr. 1975, 4p
Availability: Pub. in Jnl. of the American Medical Association, v232 n6 p621-624, 12 May 75.

Descriptors: *Ulcers, *Duodenum, *Burns(Injuries), Hemorrhage, Gastrointestinal diseases, Pathology, Reprints.

The clinical and pathological characteristics of Curling ulcer were defined by early and serial endoscopic examinations of the duodenum in 37 burned patients. Duodenal disease was present in 27 patients and occurred only in patients with burns involving more than 38% of the total body surface. Erosive 'duodenitis' could occur within 12 hours after injury and was usually associated with acute gastic disease. Isolated duodenitis occurred only in patients with pancreatitis. Contrast roentgenograms did not reliably show the superficial mucosal disease. Duodenal ulcerations were present in 12 patients and developed on a background of diffuse superficial mucosal injury. Other compilcations in the patient's post-burn course influenced disease progression. Hemorrhage occurred in six patients with duodenal disease, usually originating from a posterior duodenal ulcer. Uncomplicated ulcers invariably healed within five weeks after diagnosis. (Author)

AD-A012 089/9GA PC$4.75/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Current Status in Aerospace Medicine.
Conference proceedings,
Walton L. Jones. May 75, 77p Rept no. AGARD-CP-154
Presented at the Aerospace Medical Panel Meeting, Pozzuoli (Naples), Italy, 16-20 Sep 74. See also report dated Feb 73, AD-758 332. NATO furnished.

Descriptors: *Meetings, *Aerospace medicine, Acceleration tolerance, Air Force personnel, Symposia, Cardiovascular diseases, Ear, Human factors engineering, Ejection, Habitability, Life support, Weightlessness, Stress(Physiology), Performance(Human), Noise(Sound).
Identifiers: Skylab program.

The volume contains the text, discussion and technical evaluation of papers presented at the AGARD Aerospace Medical Panel Meeting which was held on 16-20 September 1974, in Pozzuoli (Naples), Italy. The meeting was convened to highlight areas illustrative of the current status in aerospace medicine and to indicate some of the directions in which this field will proceed in the coming years. Eight papers were presented treating a broad range of topics, including such considerations as habitability factors in the design of future space systems, ejection problems, and health and career management issues in the military services. Some of the papers were highly applied in nature, and some reported research at a basic level. All were concerned with the medical support of man in new and future aerospace systems.

AD-A012 122/8GA PC$3.25/MF$2.25
Naval Medical Field Research Lab Camp Lejeune N C
Quantitative Relationship of Ureaplasma Urealyticum to the Clinical Course of Nongonococcal Urethritis in the Human Male.
Interim rept.,
M. C. Shepard. 1974, 8p Rept no. NMFRL-Vol-XXV-No-8
Summary in French.
Availability: Pub. in Institut National de la Sante et de la Recherche Medicale. Mycoplasmas, v33 p375-380, 11-17 Sep 74.

Descriptors: *Urethritis, *Mycoplasma, Etiology, Clinical medicine, Males, Humans, Strains(Biology), Tetracyclines, Signs and symptoms, Urease, Cultures(Biology), Pathogenic microorganisms, Infections, Statistical analysis, Reprints.
Identifiers: Ureaplasma urealyticum, T-mycoplasma.

The pathogenic role of Ureaplasma urealyticum (T Mycoplasma)in nongonococcal urethritis (NGU) was examined by a quantitative cultural method. Selected male patients with primary or recurrent U. urealyticum-associated NGU were treated with reduced regimens of tetracyclines in an attempt to induce a 50% or greater relapse rate. Assessment of significant of U. urealyticum association to the clinical course of NGU was measured by quantitative urine cultures employing a urease color test medium. Of 23 NGU patients followed, 12 were cured, two were treatment failures and nine relapsed following an eclipse period, during which all symptoms were normal and cultures were negative. Relapse was heralded by a return of positive Ureaplasma agar cultures and a rising urine titer, which was accompanied clinically by simultaneous reappearance of dysuria. This was followed, in turn, by return of urethral discharge an average of 6.1 days later, and reestablishment of the disease. U. urealyticum urine titers attained or exceeded pretreatment levels in all nine NGU patients who relapsed. The evidence presented, showing a close, quantitative relationship of U. urealyticum to the clinical course of NGU in relapse, supports a pathogenic role of this organism in the etiology of NGU.

AD-A012 239/0GA PC$3.75/MF$2.25
California Univ San Francisco
The Role of Inorganic Phosphate in Oxygen Transport.
Annual progress rept. 1973-1974,
George F. Sheldon. 5 Nov 74, 29p
Contract DADA17-72-C-2030

Descriptors: *Phosphorus compounds, *Erythrocytes, *Blood transfusion, Oxygen, Glycolysis, Adenosine phosphates, Blood preservation.
Identifiers: *Oxygen transport mechanisms, Phosphorus inorganic compounds, Glyceric acid/bis(dihydrogen-phosphate).

The studies are concerned with the role of inorganic phosphate in the modulation of red cell glycolysis by the formation of 2,3 disphosphoglycerate and adenosine triphosphate and their interaction with the red cell in the recovery from massive transfusion. The thrust of these studies has attempted to delineate the importance of the half saturation point (P50 of the oxyhemoglobin association curve), low levels of 2,3 diphosphoglycerate and adenosine triphosphate in blood of extended storage life and the role of inorganic phosphate in repletion. The data indicate that patients receiving 90% or more of their blood volume have wide ranges of inorganic phosphate variation while a small group of patients have very low inorganic phosphates which conceivably is due to its incorporation to the red cell. More patients have high levels of inorganic phosphates which may be considered a useful response and correlates well with the return of red cell phosphates.

AD-A012 330/7GA PC$3.25/MF$2.25
Naval Medical Research Unit No 4 Great Lakes Ill
Detection of Adenovirus in Patient Specimens by Indirect Immune Electron Microscopy,
W. A. Valters, L. G. Boehm, E. A. Edwards, and M. J. Rosenbaum. 20 Jan 75, 4p
Availability: Pub. in Jnl. of Clinical Microbiology, v1 n5 p472-475 May 75.

Descriptors: *Adenoviruses, *Electron microscopy, Detection, Immunology, Reprints.
Identifiers: Indirect immune electron microscopy.

Immune electron microscopic procedures for the detection of adenovirus type 7 directly in throat swab specimens from patients are described. Nineteen of 25 throat swab samples, known to be positive for adenovirus type 7 by isolation of virus from tissue culture, were shown to contain aggregates of adenovirions coated with antibody. Sensitivity tests of the immune electron microscopic method showed that as few as 16 to 32 tissue culture infective doses of virus could be detected by the direct immune electron microscopic technique. It was also demonstrated that aggregation of virus-antibody complexes could be further enhanced by use of anti-immunoglobulin G sera (indirect immune electron microscopic procedures). These results demonstrate that examination of patient specimen by immune electron microscopic procedures is a feasible and rapid method for adenovirus detection and suggest that it could be applied as a routine laboratory procedure for the diagnosis of other virus infections.

AD-A012 334/9GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Spinal Cord Injury Following Electrical Accidents: Case Reports,
Norman S. Levine, Arnold Atkins, Daniel W. McKeel, Jr., Sanford D. Peck, and Basil A. Pruitt, Jr. 1974, 6p
Availability: Pub. in Jnl. of Trauma, v15 n5 p459-463 May 75.

Descriptors: *Spinal cord, *Wounds and injuries, Electric current, Pathology, Reprints.

Case reports of two patients with electric injury to the spinal cord have been presented. In one patient, the injury was fatal, and post-mortem sections of the spinal cord documented the extent of injury. A literature review suggests that electric injury to the spinal cord may be either transient or permanent. In transient injuries the symptoms appear immediately and usually clear within 24 hours after the accident. Permanent injuries may not be apparent until days following the accident. They may be associated with minimal injury to the skin and deep structures. The extent of such injury ranges from localized paresis to quadriplegia. Motor deficits occur more frequently than sensory loss. The clinical presentation may take the form of an ascending paralysis, amyotrophic lateral sclerosis, or a transverse myelitis. Neurologic recovery is unusual; but functional loss may be minimized by vigorous physical therapy. (Author)

AD-A012 335/6GA PC$3.25/MF$2.25
Brooke Army Medical Center Fort Sam Houston Tex Army Inst of Surgical Research
Progressive Pulmonary Insufficiency and Other Pulmonary Complications of Thermal Injury,
Basil A. Pruitt, Jr., Daryl R. Erickson, and Alan Morris. 1974, 12p
Availability: Pub. in. Jnl. of Trauma, v15 n5 p369-379 May 75.

Descriptors: *Pulmonary function, *Burns(Injuries), Lungs, Pathology, Reprints.

AD-A012 357/0GA PC$3.25/MF$2.25
Northern Arizona Univ Flagstaff Dept of Biological Science
Effects of Alpha0Methyltyrosine and 5-Fluorouracil on Astrocyte Density in the Rat Spinal Cord Dorsal Funiculi after Stab-would Lesion.
Annual rept. no. 2, 1 Jun 73-31 May 74,
John Norman Grim. 30 Jan 75, 11p
Contract DADA17-72-C-2155
See also Volume 1, AD-777 016.

Descriptors: *Spinal cord, *Nerve cells, *Regeneration(Physiology), *Tyrosine, *Central nervous system, Laboratory animals, Experimental data, Fluorine compounds, Neurology, Nerves, Wounds and injuries, Rats, Chemotherapy.
Identifiers: Tyrosine/methyl, *Fluorouracil.

Rats were lesioned by a stab wound in the mid-thoracic spinal cord. Chemotherapy with alpha methyl-tyrosine (AMT) followed shortly. This represented an attempt to reduce the concentration of norepreneph rine which causes hemorrhage and subsequent necrosis of cells of the central nervous system. This was followed by determining the extent of post-trauma gliosis (astrocyte density). The AMT treated cord has an average astrocyte density that is 11.1% greater than the control (lesion and no chemotherapy). However, this difference was not statistically significant.

NTIS/PS-75/578/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Immunologic Diseases. Volume 2. 1975 (A Bibliography with Abstracts).
Rept. for 1975-Jul 75,
Pernell W. Crockett. Jul 75, 67p*
Supersedes NTIS/PS-74/126. See also Volume 1, NTIS/PS-75/579.

Descriptors: *Bibliographies, *Immunologic diseases, Allergic diseases, Pathology, Immunology.
Identifiers: Hypersensitivity, Autoimmune diseases, Allergenic extracts, Allergens.

The bibliography contains research on immunodeficiency, antoimmune and allergic diseases. The pathologic mechanisms of antoimmunity and hypersensitivity are discussed. Also included are repots on allergenic extracts for diagnostic purposes. (Contains 62 abstracts) See also NTIS/PS-75/579, Immunologic Disease. Volume 1. 1964-1974.

NTIS/PS-75/579/3GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Immunologic Diseases. Volume 1. 1964-1974 (A Bibliography with Abstracts).
Rept. for 1964-1974,
Pernell W. Crockett. Jul 75, 242p*
See also Volume 2, NTIS/PS-75/578.

Descriptors: *Bibliographies, *Immunologic diseases, Allergic diseases, Pathology, Immunology.
Identifiers: Hypersensitivity, Antoimmune diseases, Allergenic extracts, Allergens.

The bibliography contains research on immunodeficiency, antoimmune, and allergic diseases. The pathologic mechanisms of antoimmunity and hypersensitivity are discussed. Also included are reports on allergenic extracts for diagnostic purposes. (Contains 237 abstracts)

NTIS/PS-75/580/1GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Telecommunications in Medicine (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Elizabeth A. Harrison. Jul 75, 41p*

Descriptors: *Bibliographies, *Telecommunication, *Medical services, Consulting services, Hospitals, Medical records, Information systems, Closed circuit television, Telephone systems, Rural areas, Urban areas, Education.
Identifiers: Health care delivery systems, *Teleconsultation, Biomedical information systems, Medical education.

These selected citations of Federally sponsored research reports cover teleconsultation, communications for emergency medical services, medical communication networks and television systems and rural health services. (Contain 36 abstracts)

N75-24315/4GA PC$4.00
National Aeronautics and Space Administration, Washington, D.C.
Aerospace Medicine and Biology: A Continuing Bibliography with Indexes, Supplement 139.
Mar 75, 78p NASA-SP-7011(139)

Descriptors: *Aerospace medicine, *Bibliographies, *Biological effects, Flight stress (Biology), Health physics, Human factors engineering, Life support systems, Survival, Toxicology.

For abstract, see STAR 1315

N75-24325/3GA PC$3.25/MF$2.25
Technische Hogeschool, Delft (Netherlands). Man-Machine Systems Group.
A Multi-Disciplinary Team for the Treatment of Patients with Defect Upper Extremities: A Need for Optimal Rehabilitation.
W. J. Luitse, and H. G. Stassen. Dec 74, 20p WTHD-67

Descriptors: *Clinical medicine, *Medical personnel, *Medical services, *Physical factors, Graphs (Charts), Handicaps, Prosthetic devices.

For abstract, see STAR 1315

N75-24330/3GA PC$4.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
The Cause of Death Resulting from Transfusion Resistant Shock. Part 1: Influence of Brain Damage de Doodsoorzaak Bij Transfusie-Resistente Shock. 1. De Betekenis van de Beschadiging van de Hersenen.
M. Wijnans, J. A. Luthjens-neijhoff, and P. Vaneck. 1975, 65p MBL-1975-1, TDCK-65628
In Dutch; English Summary.

Descriptors: *Brain damage, *Death, *Rats, *Shock, *Transfusion, Blood, Blood circulation, Human pathology, Resistance, Tolerances (Physiology).

For abstract, see STAR 1315

N75-24331/1GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Respiratory and Intraperitoneal Infection of Mice with Encephalomyocarditis Virus: Effect of Sublethal X-Irradiation on Host Resistance and Survival.
W. J. C. Bogaerts, and B. J. Durville-vanderoord. 1975, 23p MBL-1975-2, TDCK-65777

Descriptors: *Encephalitis, *Immunity, *Inoculation, *Peritoneum, *Respiratory diseases, *Viruses, Infectious diseases, Mice, Myocardium, Resistance, Survival, Virulence, X ray irradiation.

For abstract, see STAR 1315

PB-242 257/4GA PC$3.75/MF$2.25
Texas Univ. Southwestern Medical School at Dallas.
Mammalian Pregnancy: A Study of Immunoregulatory Processes of Cell Mediated Hypersensitivity.
Annual rept. 24 Jun 74-23 Jun 75,
Alan E. Beer, and R. E. Billingham. 15 May 75, 47p NIH/TIB-029
Contract N01-AI-42531

Descriptors: *Surgical transplantation, *Genetics, Lymphocytes, Bone marrow, Immunology, Blood cells, Antigens, Antibodies, Pregnancy, Cells(Biology), Immunity, Rats, Experimental data.
Identifiers: *Hypersensitivity, *Histocompatibility antigens, *Immunosuppression, Graft versus host disease.

Inbred rats of the Fischer (FI) Ag-B(1) and DA, Ag-B(4) strains were used to study the influence of maternal exposure to alien histocompatibility antigens during pregnancy on subsequent reactivity to paternal antigens. FI rats were challenged with DA skin allografts 10 days post partum after 1, 2-4, or 5-8 pregnancies by DA males. Graft survival times and titers of anti-DI hemagglutinins elicited were compared with those of similarly grafted virgin FI females and FI females multiparous by FI males.

PB-242 284/8GA PC$3.25/MF$2.25
Northwest Kidney Center, Seattle, Wash.
A Comparison of Home Hemodialysis and Home Peritoneal Dialysis in Patients Trained at a Community Dialysis Center.
Annual progress rept. Jun 74-Jun 75,
Christopher R. Blagg. 20 Jan 75, 10p AK-1-3-2215
Contract N01-AM-3-2215

Descriptors: *Artificial kidneys, Mechanical organs, Medical equipment, Renal failure, Uremia, Therapy, Patients, Education, Evaluation.
Identifiers: *Hemodialysis, *Peritoneal dialysis, Chronic diseases, *Home nursing care.

The report summarizes experience with peritoneal dialysis at the Northwest Kidney Center, Seattle, over the last three years. The evolution of peritoneal dialysis equipment is described. Patient selection and patient training is discussed, together with information on back-up dialysis rates for medical, technical and other reasons in patients on peritoneal dialysis and hemodialysis. The results reflect the effectiveness of long term treatment with peritoneal dialysis in selected patients, and support the need for a more detailed comparative study of the role of maintenance peritoneal dialysis in the treatment of patients with chronic renal failure.

PB-242 378/8GA PC$4.25/MF$2.25
Northeastern Illinois Planning Commission, Chicago.
An Environmental Health Evaluation of Highway Networks. A Methodological Development.
Final rept.,
Donna O. Farley, and R. A. Wadden. Jun 74, 72p A615.0674
Prepared in cooperation with Illinois State Dept. of Transportation, Springfield, and Environmental Health Resource Center, Chicago, Ill.

Descriptors: *Highway planning, *Public health, Air pollution, Freeways, Land development, Human ecology, Transportation, Transportation models, Exhaust gases, Noise(Sound), Emission, Carbon monoxide poisoning, Toxicity, Evaluation, Methodology.
Identifiers: *Air pollution effects(Humans).

The study presents the design and application of a methodological technique for evaluating the environmental health impacts of alternative freeway transportation network plans on susceptible, high risk population groups. Using comparative analysis, the evaluation estimates and summarizes net pollution effects, including both negative and positive highway impacts, and suggests areas of planning concern to which the suggested methods might be applied.

PB-242 726/8GA PC$4.75/MF$2.25
Southern Illinois Univ. School of Medicine, Carbondale. Measuring Health Concepts Research Project.
Measures of Perceptions Regarding Health Status: Preliminary Findings.
Progress rept. 30 Jun 72-30 Sep 74,
John E. Ware, Jr., W. Russell Wright, and Mary K. Snyder. Jul 74, 96p MHC-74-13
Contract HSM-110-72-299

Descriptors: *Attitude surveys, *Health, Adults, Illinois, Tables(Data), Factor analysis, Management methods, Psychometrics, Questionnaires, Responses, Reliability.

A scale to measure perceptions regarding health status (current health, prior health, and resistance to illness) and response to health state (lack of health anxiety and acceptance of the patient role) was administered to a sample of adults living in Illinois. Factor analytic methods were used to study the interrelationships among scale items. Scale items that met factor analytic criteria were used to compute score estimates for five health concepts. Reliability of these estimates was studied using internal consistency and test-retest methods. Relationships among the five concepts were studied using score estimates derived from both simple and complex methods. A higher-order factor analytic study of two hypothesized common dimensions was conducted. The validity of the five measures was studied in relation to selected health outcomes and sociodemographic variables of interest. Scale revisions designed to improve the reliability and validity of index scores were summarized.

PB-242 743/3GA PC$4.25/MF$2.25
Bascomb Associates, Inc., Silver Spring, Md.
An Assessment of the Kinds of Measures (And Their Availability) Required to Determine the Impact of Categorization on Hospital Finance.
Final rept. 30 Jun 74-29 Feb 75,
Phyllis F. Evans, and Rudolph Marchese. 25 Mar 75, 57p NCHSR-75/108
Contract HRA-106-74-134

Descriptors: *Hospitals, *Medical services, *Finance, Transportation, Evaluation, Recommendations, Education, Regional planning, Urban areas, Patients, Costs, Communication systems, Medical records.
Identifiers: *Emergency medical services, Health care facilities, *Hospital administration.

The report assesses the kinds of measures (and their availability) required in order to determine the impact of categorization on hospital finance. It includes communications, transportation, program monitoring and evaluation, professional training and education, and public education. One point of view contends that the operation of a hospital emergency department constitutes a necessary and demanded community service, but one which results in a financial loss for the hospital. A second point of view, contends that hospital emergency departments provide a major source of revenue for hospitals. It was observed that categorization does result in changes in emergency service utilization patterns. Further, these changes in service patterns are readily reflected in available hospital reports and records.

PB-242 766/4GA PC$4.25/MF$2.25
Illinois State Dept. of Public Health, Springfield.
The Nursing Home Simulation Model. A Policy Tool for Long-Term Care. Executive Summary.
Progress rept. Jun 73-Jun 74,
Joyce Lashoff, Alan Berkowitz, and Mark J. Hundert. Dec 74, 67p* NCHSR-75/110
Contract HSM-110-73-501

Descriptors: *Medical services, Resources, Nursing, Simulation, Models, Patients, Costs, Evaluation, Efficiency.
Identifiers: *Nursing homes, Health care facilities, Long term care.

Two parallel concerns, adequacy of staffing and cost of care, are the basis for the development of the nursing home simulation model. The model was developed to help health planners, facility administrators, and regulatory agencies evaluate the effectiveness and efficiency of alternatively configured long-term care facilities providing different types of care to a variety of patient populations. The nursing home simulation model is capable of determining whether a given set of nursing resources is sufficient to provide a defined level of care to a particular patient population. It can also evaluate the cost effectiveness of meeting nursing care requirements of residents under alternative staffing configurations and systems for the delivery of care.

PB-242 871/2GA PC$6.25/MF$2.25
Westat, Inc., Rockville, Md. Research Div.
Evaluation of the Rates of Utilization of Medical Care by D.C. Medicaid Enrollees in a Prepaid Group Practice.
Final rept.,
Norman A. Fuller, and Krista Koziol. May 74, 153p SRS-18-57719-003
Grant SRS-18-57719

Descriptors: *Medical services, Preventive medicine, Patients, Evaluation, Expenses, Human behavior, Utilization, District of Columbia, Drugs, Hospitals, Physicians, Reliability, Attitudes, Education.

Identifiers: *Medicaid, Health care costs, Prepaid medical care, *Medical group practice, Ambulatory health care.

Health services utilization by the same 781 Medicaid patients, is compared for 12 months, 18 months and 22 months before and after enrollment into a prepaid group practice (PGP). Significant decreases in all four categories of utilization (physician encounter, drug prescription, hospital admission, hospital days) were reported for those in age group 1 to 64 years. Ambulatory physician encounter rate decreased 15 percent, drug utilization was down 18 percent, hospital admission decreased 30 percent and hospital days declined 32 percent after enrollment in the prepaid group practice. However, there was a remarkable increase in diagnositc services after enrollment. These findings provide solid support for the hypotheses that aggregate utilization of the District of Columbia Medicaid Program could be reduced by a substantial margin through voluntary enrollment of Medicaid patients in prepaid group practices.

PB-242 915/7GA PC$4.75/MF$2.25
Louisiana State Univ., Baton Rouge.
Development of Educational Materials for the Care and Prevention of Injuries to Insensitive Hands and Feet.
Final rept.,
Francis A. Drury, Jack K. Nelson, and Donald Shipley. Dec 73, 88p SRS-12-55222-001
Grants SRS-RD-2327-G, SRS-RD-2596-G

Descriptors: *Injuries, *Leprosy, *Diabetes mellitus, Integumentary diseases, Education, Patients, Preventive medicine, Hand(Anatomy), Louisiana.
Identifiers: *Extremities, *Instructional materials.

Educational materials for the care and prevention of injuries for leprosy patients were developed, used and evaluated at the U.S. Public Health Service Hospital, Carville, Louisiana, over seven years, ending December 1973. Booklets emphasizing cartoon drawings, minimal reading and audiovisual presentations were utilized. The capacity of the individual to prevent injury and subsequent bone absorption, through health habits was emphasized. The materials, geared to individuals with little education, were concluded to be effective, versatile with regard to setting and applicable to diabetics.

PB-242 922/3GA PC$3.75/MF$2.25
California Univ., San Francisco. School of Dentistry.
Total Rehabilitation of the Handicapped Oral-Facial Cancer Patient.
Final rept.,
Sol Silverman, Jr., Thomas A. Curtis, and Robert Cantor. Jun 72, 36p SRS-13-55264-001
Grant SRS-13-55264

Descriptors: *Rehabilitation, *Malignant neoplasms, *Prosthetic devices, Adjustment(Psychology), Oral diseases, Vocational guidance, Patients, Handicapped persons, Face(Anatomy), Surgery, Tables(Data), Training programs, Therapy.
Identifiers: Vocational rehabilitation, Cancer, Medical research.

A project (1968-1972) to expand the oral-facial rehabilitation program at the Medical Center, University of California, San Francisco, into a western regional center found that a regional facility can rehabilitate all oral-facially handicapped persons, if the center is equipped with a multidisciplinary staff. The project involved many educational programs and research pilot studies which proved that, in most cases, physical and social functioning of the clients were restored, but vocational rehabilitation was not as successful.

PB-242 994/2GA PC$5.25/MF$2.25
Arkansas Rehabilitation Research and Training Center, Fayetteville.
Rehabilitation of the Deaf. Report from the Study Group-A Training Guide.
Special rept.
May 73, 103p ARRTC-789 SRS-16-56812-001
Grant SRS-16-56812
Institute on Rehabilitation Services (11th) New Orleans, La., 21-23 May 73.

Descriptors: *Auditory defects, *Rehabilitation, Education, Manuals, Vocational guidance, Evaluation, Counseling, Employment, Personnel, Specialized training.
Identifiers: *Deaf persons.

Contents:
Overview of rehabilitation of deaf people;
Communication;
Outreach and referral;
Vocational evaluation of the deaf;
Cou
nseling with the deaf;
Adjustment services for the deaf;
Vocational training services for the deaf;
Employment and job retention;
Community resources, development, and utilization;
Critical rehabilitation program components for serving the deaf.

PB-243 056/9GA PC$3.75/MF$2.25
Portsmouth Dept. of Public Health, Va.
The Medical Aide Project - Case Management in a Medical Assistance Program Through the Use of the Subprofessional.
Final rept.
Feb 74, 40p SRS-11-57106-001
Contract SRS-11-57106

Descriptors: *Public health, *Mental disorders, *Socioeconomic status, Social medicine, Medical services, Utilization, Counseling, Social welfare.
Identifiers: *Low income groups, Allied health personnel.

The purpose of the project was to determine whether physical and mental health of low-income persons would be improved by no-cost physical examinations, and also by medical and general counseling by indigenous medical case aides. Data on health status, utilization of medical services and environmental status were compared for two groups of experimental subjects (1497) and 831 control subjects. Data were also analyzed according to the type of assistance being received: (1) aid to dependent children (ADC), (2) aid to the permanently and totally disabled and (APTD) old age assistance (OAA). Intermediate data are given, but definite analysis and conclusions are left to a later report.

6F. Environmental Biology

AD-A011 851/3GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Development of Laboratory Model Ecosystems as Early Warning Elements of Environmental Pollution.
Final rept.,
Robert L. Metcalf. Dec 74, 12p Rept no. AMRL-TR-74-125-Paper-1
Prepared in cooperation with Illinois Univ., Urbana-Champaign.

Descriptors: *Ecology, *Water pollution, *Air pollution, Toxicology, Simulation, Models, Drugs, Pesticides, Insecticides, Biodeterioration, Chemicals, Ecology.
Identifiers: *Ecosystems, Evaluation.

To date the authors have studied the fate of approximately 100 organic compounds in the several types of model ecosystems described. The use of the model ecosystem technology provides a relatively simple way to measure the environmental toxicology and degradation pathways for new compounds in a variety of organisms. Model ecosystems are invaluable for screening new compounds for environmental persistence and degradation to demonstrate which of many possible derivatives or modifications are least hazardous to environmental quality. Model ecosystems provide the only practical way to study the complex interactions involved in the biological behavior of mixtures of environmental pollutants. Finally, model ecosystem studies are unusually graphic and visually appealing and have considerable teaching value for study of the problems of environmental micropollution.

AD-A011 852/1GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Ecosystem Modeling.
Final rept.,
William J. Grenney, and Donald B. Porcella. Dec 74, 28p Rept no. AMRL-TR-74-125-Paper-2
Prepared in cooperation with Utah State Univ., Logan.

Descriptors: *Ecology, Bays, Models, Mathematical models, Temperature, Light, Response(Biology), Light, Simulation.
Identifiers: *Ecosystems, Aquatic biology, Growth(Exposure).

Ecosystems are systems of living organisms in a physical chemical environment which have developed and adapted over long periods of time. As such, they present unique problems for quantitative description and prediction. Mathematical models can be powerful tools for analyzing systems. Models are constructed for particular purposes and are subject to numerous limitations. Although it can be concluded that all models are less than perfect, their evaluation should only be based on characteristics in relation to their proposed use. In this regard an optimal balance between accuracy and practicability is sought, and, in fact, is often approached.

AD-A011 853/9GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
The Role of Bioassays in Environmental Research.
Final rept.,
Donald I. Mount. Dec 74, 8p Rept no. AMRL-TR-74-125-Paper-3
Prepared in cooperation with National Water Quality Lab., Duluth, Minn.

Descriptors: *Bioassay, *Toxicology, Ecology, Water pollution, Wastes, Chemical analysis, Aquatic animals, Aquatic plants.
Identifiers: Bioindicators, Indicator species, *Water pollution effects(Animals), *Water pollution effects(Plants), Ecosystems.

The report discusses the role bioassays play in water pollution control efforts. Predictive tools are needed so the degree of treatment and the permissible amount of waste materials discharged to water can be determined when a plant is constructed. The standard toxicity tests involve chemical analysis and bioindicators of pollution. A problem of aquatic toxicologists is relating toxic effects of a chemical or waste to varying characteristics of water receiving the substances. Better measurements may eliminate much of the apparent variable toxicity that is observed, particularly in regard to metals in various types of water.

AD-A012 008/9GA PC$5.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss

Aquatic Plant Control Program. Technical Report 10. Integrated Program for Alligator Weed Management.
Final rept.,
E. O. Gangstad, R. D. Blackburn, W. C. Durden, Jr., T. D. Center, and J. Balcuinas. Jun 75, 120p
Rept no. AEWES-APCP-TR-10
See also rept. no. 9, AD-A008 980.

Descriptors: *Aquatic plants, *Pest control, *Herbicides, *Reservoirs, Insects, Damage, Biological control, Water quality, Chemical properties, Distribution, Hardness, Toxicity, Correlation techniques, Tables(Data).
Identifiers: Alligator weeds, Water hyacinths, D 2-4 herbicide, Silvex, Endothall, Agasicles hygrophila, Amynothrips andersoni, Vogtia malloi.

The use of herbicides coordinated with insect-feeding damage as a method for alligator weed management is discussed. Detailed studies on the integrated control method include the details of the research program relating to an integrated approach, the effects of water quality on the distribution of alligator weed and water hyacinth, the effects of water hardness on herbicide toxicity, and the evaluation of promising herbicides for the control of alligator weed and water lettuce. Color illustrations reproduced in black and white.

COM-75-10896/9GA PC$3.25
Delaware Univ., Newark. Coll. of Marine Studies.
Diversity of Marine Invertebrates in a Thermal Effluent,
Dennis T. Logan, and Don Maurer. Mar 75, 11p
DEL-SG-9-75 NOAA-75061103
Grant NOAA-2-35223
Pub. in Jnl. Water Pollution Control Federation, pt1 v47 n3 p515-523 Mar 75.

Descriptors: *Aquatic animals, *Invertebrates, *Thermal pollution, *Indian River, *Delaware Bay, Aquaculture, Benthos, Marine microorganisms, Indicator species, Analysis of variance, Salinity, Oxygen, Sampling.
Identifiers: Reprints, Species diversity, Sea Grant program.

It has been hypothesized that species diversity may be used to determine the effect of a pollutant on a community. In order to test this hypothesis, the effect of a thermal effluent on an estuarine benthic community, Indian River (DE), was recorded. Environmental parameters and several community measures, including diversity, were explored. Change in community structure was characterized and related to both diversity and environment.

NTIS/PS-75/581/9GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Aquatic Weed Control (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Elizabeth A. Harrison. Jul 75, 98p*

Descriptors: *Bibliographies, *Aquatic weeds, *Weed control, Algae, Herbicides, Pest control, Algicides, Water quality, Aquatic plants.
Identifiers: Biological weed control, *Aquatic weed control, *Water pollution effects(Plants), *Water pollution effects(Animals).

The selected citations of Federally-sponsored research reports cover herbicide and biological weed control. The effects on water quality and ecology are discussed. All types of weeds are covered, including algae blooms. The harvesting of these weeds is also included. (Contains 93 abstracts)

PB-242 418/2GA PC$4.25/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
Health Effects of Fossil Fuel Combustion Products. Report of a Workshop Sponsored by the Cornell Energy Project and Electric Power Research Institute Held at Indian Wells, California on November 11-13, 1974.
Special rept.,
Cyril L. Comar. May 75, 75p EPRI-SR-11

Descriptors: *Meetings, *Fossil fuels, *Combustion products, *Public health, *Air pollution, Particles, Epidemiology, Nitrogen oxides, Sulfur oxides, Airborne wastes, Monitors, Carcinogens, Mutagens, Exposure, Physiological effects.
Identifiers: *Air pollution effects(Humans).

The workshop is the first of a series of specialized meetings to provide considered and authoritative guidance for the research needed on a national basis and by the utility industry to assure that energy needs are met with a minimum environmental cost. The emphasis of this workshop was entirely on the scientific basis for decision making related to the health effects of the fossil fuel combustion products on human health and well-being. The report restricts itself primarily to brief judgmental positions on the state of knowledge relating air pollution to health. The key questions considered were: If our present information is adequate yet important to the development of national policy, what needs to be done to sharpen the information, and how should the nation go about filling these needs. The report represents an attempt to define research directions aimed at filling these energy needs safely.

PB-242 765/6GA PC$6.25/MF$2.25
International Biological Program. U.S. National Committee.
U.S. Participation in the International Biological Program.
Summary 1968-73.
1974, 173p* USNC/IBP-6
Contract NSF-C310
See also PB-233 693.

Descriptors: *Human ecology, *Environmental aspects, *Biological surveys, International congresses, Projects, Program design, Natural resources, Forest land, Anthropology, Grassland, Deserts, Tundra, Islands(Landforms), Marine biology, Aerobiology, Specialized training, Conservation, Genetics, Eskimos, Population migrations, Urban population, Nutrition.
Identifiers: Ecosystems, South American Indians.

This last report in a series presents a summary of accomplishments attributed to the seven years of active U.S. participation in the IBP. The Analysis of Ecosystems Biomes and other environmental management programs are summarized. The Human Adaptability Programs, which had generally somewhat more international coordination, are reviewed. The report discusses international exchange of information and the extent to which integration of work was accomplished. Contributions of the IBP to manpower training and recommendations for continuing work are added. The Appendix lists the IBP participants, and includes a bibliography.

PB-242 843/1GA PC$8.75/MF$2.25
Northern Arizona Univ., Flagstaff. Environmental Impact Studies.
Navajo Generating Station Ecological Baseline Studies.
Annual rept. 1 Jun 71-31 May 72,
W. S. Gaud, D. W. Blinn, J. S. States, R. H. Hevlyn, and W. L. Lipke. 31 May 72, 282p
NAU/EIS-72/0001
Prepared in cooperation with Arizona Public Service, Co., Phoenix, Brigham Young Univ., Provo, Utah. Center for Health and Environmental Studies, Salt River Project, Phoenix, Ariz.

Descriptors: *Ecology, *Environmental impacts, *Electric power plants, Inventories, Plants(Botany), Animals, Vegetation, Construction, Deserts, Wildlife, Shrubs, Grasses, Forest land, Invertebrates, Fungi, Algae, Bacteria, Soil analysis, Water analysis, Arizona, Utah.
Identifiers: *Ecosystems, Page(Arizona), Baseline studies, Vascular plants, *Navajo generating station, Kaiparowits generating station.

A six year study of the probable environmental impact of electric generating stations (the Navajo Generating Station under construction and the planned Kaiparowits Generating Station) in the Kaiparowits Basin was initiated. There were three main objectives during this 1st year of study: (1) To produce an inventory of native plant and animal species; (2) to accumulate descriptive data on the predominant vegetational communities and environmental factors; and, (3) to begin a study of the impact of the construction of the power plants. Emphasis was placed on representative desert communities: Blackbruch shrubland, sand dune shrubland, grassland, and pinyon-juniper woodland. Collections from the area include 609 species of vascular plants, of non-vascular plants, and of invertebrates that were previously unknown in the area. Aggregates of soil fungi species were characteristic of communities of higher vegetation in which they were found. Soil algae diversity was low and species tended to be restricted to surface levels. Several potential nitrogen fixing bacteria and algae were found. Analysis of soil and of watr from seeps and springs was carried out. Biotic change resulting from natural events and human influences is discussed.

PB-242 844/9GA PC$3.75/MF$2.25
Northern Arizona Univ., Flagstaff. Environmental Impact Studies.
Environmental Studies of the Kaiparowits Generating Station: Supplemental Report,
W. S. Gaud, D. W. Blinn, D. Czarnecki, R. R. Guerrero, and J. S. States. 1 Jul 74, 28p
NAU/EIS-74/003
Prepared in cooperation with Southern California Edison Co., Los Angeles.

Descriptors: *Ecology, *Environmental impacts, *Electric power plants, Fungi, Soils, Aquatic animals, Invertebrates, Mercury(Metal), Fishes, Vegetation, pH, Carbonate, Bacteria, Plankton, Diatoms, Lake Powell, Pollution, Arizona, Utah.
Identifiers: *Ecosystems, *Kaiparowits generating station, Baseline studies, Page(Arizona).

The purpose of the investigation was to obtain a baseline of information on: (1) Microbial soil communities; (2) aquatic macroinvertebrates; (3) water quality; (4) aquatic habitat; and (5) aquatic primary producers. Microbial studies were carried out in Southern Utah on Fourmile Bench and on Nipple Bench. Aquatic studies were carried out in the drainages into Lake Powell. In addition, available data was obtained on previous assessments of mercury concentrations found in Lake Powell fish. Each vegetation community was characterized by the unique occurrence of particular fungi and by the greater relative frequency and abundance of certain groups of fungi. Average pH values and soil carbonates were higher in soils of the to benches than in counterpart soils near Page, Arizona, indicating greater buffering capacity against acid effluent gases. Seeps and springs demonstrated relatively well-developed communities of aquatic invertebrates compared to the low numbers and diversity of the bays. The high number of coliforms was probably related to grazing animals. Diatoms in the drainages were identified and several species also contribute significantly to the phytoplankton of lower Lake Powell.

PB-242 845/6GA PC$10.25/MF$2.25
Northern Arizona Univ., Flagstaff. Environmental Impact Studies.
Environmental Impact Studies of the Navajo and Kaiparowits Power Plants. Volume 1.
Annual rept. no. 31 Jun 73-31 May 74,
W. S. Gaud, M. I. Jenness, R. H. Hevly, L. Zaleski, and J. R. Davey. 1974, 390p NAU/EIS-74/001-Vol-1
Prepared in cooperation with Arizona Public Service Co., Phoenix, Salt River Project, Phoenix, Ariz., and Brigham Young Univ., Provo, Utah. Center for Health and Environmental Studies.

Descriptors: *Ecology, *Environmental impacts, *Electric power plants, Monitoring, Vegetation, Mammals, Climate, Soils, Bacteria, Shrubs, Parisites, Mercury(Metal), Diatoms, Trace elements, Ecological succession, Lake Powell, Pollution, Arizona, Utah.
Identifiers: *Ecosystems, *Navajo generating station, *Kaiparowits generating station, Page(Arizona), Ephedra.

During the third year of study field investigations were concentrated at 8 study sites in the vicinity of Page, Arizona. The central purpose of this study was twofold: (1) To determine what effects effluent from power plant operation would have on the ecosystems; and (2) to determine whether those effects would be ecologically significant. A monitoring program was initiated to determine the pattern of changes exhibited by vegetation, by small mammals, by weather, by microbes, and by soil factors. Temperature, humidity, and rainfall seemed to be most variable. A few trends were observed in the vegetation over the past three years, but its high variability probably resulted from the different weather regimes. Changes in the dynamics of small mammal populations were clearer and were synchronized to a large extent in the five communities close to Page. Threshold levels for the destruction of the shrub Ephedra by its insect parasite were determined. Mercury in Lake Powell was found to be more highly concentrated in the bays than in the channels and thresholds for observed effects on diatoms were determined. Baseline trace element concentrations in soil, water, and vegetation were measured.

PB-242 846/4GA PC$8.50/MF$2.25
Northern Arizona Univ., Flagstaff. Environmental Impact Studies.
Environmental Impact Studies of the Navajo and Kaiparowits Power Plants.
Annual rept. no. 2, 1 Jun 72-31 May 73,
W. S. Gaud, J. R. Davey, J. S. States, M. I. Jenness, and R. R. Guerrero. 31 May 73, 260p NAU/EIS-73/001
Prepared in cooperation with Arizona Public Service, Co., Phoenix, Salt River Project, Phoenix, Ariz., and Brigham Young Univ., Provo, Utah. Center for Health and Environmental Studies.

Descriptors: *Ecology, *Environmental impacts, *Electric power plants, Vegetation, Bacteria, Soils, Mammals, Lake Powell, Mathematical models, Soil microbiology, Parasites, Shrubs, Land reclamation, Navajo Mountain, Plankton, Symbiosis, Pollution, Arizona, Utah.
Identifiers: *Ecosystems, *Navajo generating station, *Kaiparowits generating station, Ephedra.

During the second year of study investigative efforts were concentrated on above-ground vegetation, microbial systems, small mammals, and Lake Powell, and includes monitoring of relevant biotic and abiotic factors, the subjection of laboratory systems to simulated effluent, and the synthesis of data through computer analysis and modeling. Soils were primarily coarse-textured, sandy loams with low moisture holding capacity, organic matter content, nitrogen and sulfur content, and were moderately saline with neutral to alkaline H. Sulfur content of soils and vegetation varied with elevation. Decomposition of soil organic matter was slow and respiration of soil microbial communities was low. A beetle parasite was found to be a significant mortality factor of Ephedra. Preliminary exposure of native grasses to sulfur dioxide showed seedlings to be more sensitive than mature plants. Analysis of vegetational communities revealed high variability among sites and over time. Disturbed lands have been partially reclaimed. Productivity measurements in a grassland were initiated. Ponderosa trees on nearby Navajo Mountain appeared to be heavily impacted by natural stresses. Phytoplankton and zooplankton dynamics in the lower bays of Lake Powell were investigated and a preliminary study of the effect of mercury on native diatoms was carried out.

PB-242 847/2GA PC$6.25/MF$2.25
Northern Arizona Univ., Flagstaff. Environmental Impact Studies.
Environmental Impact Studies of the Navajo and Kaiparowits Power Plants. Volume 2. Phytoplankton Population Dynamics in Warm Creek Bay, Lake Powell.
Annual rept. no. 3, 1 Jun 73-31 May 74,
A. J. Stewart, D. W. Blinn, T. Tompkins, and S. N. Wilkes. 31 May 74, 162p NAU/EIS-74-002
Prepared in cooperation with Arizona Public Service Co. Phoenix, Salt River Project, Phoenix, Ariz., and Brigham Young Univ., Provo, Utah. Center for Health and Environmental Studies.

Descriptors: *Ecology, *Environmental impacts, *Electric power plants, *Plankton, Lake Powell, Thermoclines, Oxygen, Temperature gradients, Aquatic biology, Inorganic nitrates, Pollution, Diatoms, Limnology, Seasonal variations, Correlation techniques, Tables(Data), Arizona, Utah.
Identifiers: *Navajo generating station, *Kaiparowits generating station, Fragilaria crotonensis, Asterionella formosa, Dinobryon sertularia, Cryptomonas erosa.

Seasonal and depth distributions of twenty phytoplankton species and selected physiochemical parameters were followed for a thirteen-month period in the relatively new Lake Powell reservoir. Temperature fluctuations allowed the bay to be classified as a warm monomictic system. The pronounced summer thermocline led to the development of a zone of oxygen depletion. The spring diatom maximum (Fragilaria crotonensis, Asterionella formosa) was succeeded almost immediately by a long pulse of Dinobryon sertularia. Three species of Scenedesmus showed some temporal and spatial niche differentiation, and Cryptomonas erosa seemed to be heterotrophic. Synedra flourished during the winter months. Multiple correlation analysis suggested that water temperature was a critical algal population regulator. Nitrogen compounds were also implicated although to a lesser extent.

6H. Food

AD-A012 158/2GA PC$4.25/MF$2.25
Agricultural Research Service Beltsville Md Marketing Research Inst
Evaluation of Frozen Beef Patties Containing Soy Protein.
Final rept. 26 Apr 72-30 Jun 74,
Anthony W. Kotula, G. G. Twigg, and E. P. Young. Jun 74, 57p NDC-TR-75-80, FEL-23

Descriptors: *Beef, *Frozen foods, *Soybeans, *Additives, Proteins, Storage, pH, Acceptability, Flavor, Colors, Odors, Toughness, Barbituric acids, Peroxides, Texture, Chemical properties.
Identifiers: *Soy proteins, Food protein consentrates, Food storage, Cooking.

Four samples of textured soy protein (TSP) and two of granular soy protein concentrate (SPC) were incorporated into ground beef at levels of 20 and 30% in accord with Food Nutrition Service Notice 219. Patties prepared therefrom together with an all-beef control were frozen and examined at 0, 3, 6, 9 12 months. Examination included proximate analysis; ph, peroxide and thiobarbituric acid values; and, after standardized cooking, evaluation by three types of panels for flavor, tenderness, appearance, aroma, juiciness, and over-all acceptability. Soy additives did not promote oxidative or sensory changes during 12 months frozen storage.

AD-A012 198/8GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Rod-Shaped Food for High-Altitude Feeding.
Final rept. Oct 71-Dec 74,
Joseph C. Crigler, and John E. Vanderveen. May 75, 10p Rept no. SAM-TR-75-10

Descriptors: *Feeding, *Pilots, Faceplates, Pressure suits, High altitude, Flight clothing, Food, Rods, Inserts, Human factors engineering, Flavor, Consistency, Acceptability.

A rod-shaped food concept using 0.2-in.-diameter by 3-in rods was operationally tested to meet the demands of pilots wearing full-pressure suits for solid or chewy foods. Of 7 food items evaluated, 6 had very acceptable flavor. Single- and multicavity rod-type devices for inserting the food items through the face plate of the pressure suit were acceptable. The multicavity device was more acceptable to newer pilots in the program, and the single-type device was more acceptable for experienced pilots. (Author)

AD-A012 313/3GA PC$4.25/MF$2.25
Massachusetts Univ Boston
Program Evaluation: A Consumer Evaluation of Alternative Contractor Concepts in Government Food Service.
Technical rept.,
Laurence G. Branch. Sep 74, 67p NDC-TR-75-59-FSL
Contract DAAK03-74-C-0098

Descriptors: *Food dispensing, *Military facilities, *Contracts, Consumers, Surveys, Quality, Taste, Food processing, Acceptability.
Identifiers: Evaluation.

Two contractor concepts were studied using a paper and pencil consumer opinion survey and by comparing results with similar data from previously surveyed bases with non-contractor food service facilities. The food factors (quality, variety, and quantity, in that order) were generally rated by consumers as most serious problems, in keeping with many previous survey studies of military food service system. The contractor food service concept with raw food provided by the contractor, as exemplified by Fort Myer, significantly reduced consumer problems in food service personnel, speed, hours, environment, and convenience of location, and also reduced the degree to which food variety, service, speed and hours affected non-attendance. The contractor food service concept with raw food provided by the government showed more consumer problems with food quality, variety, and service, and greater contribution to non-attendance from these same factors.

NTIS/PS-75/576/9GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Food Processing. Volume 2. Jul 74-Jun 75 (A Bibliography with Abstracts).
Rept. for Jul 74-Jun 75,
Elizabeth A. Harrison. Jul 75, 100p*
Supersedes NTIS/PS-74/119. See also Volume 1, NTIS/PS-75/577.

Descriptors: *Bibliographies, *Food processing, Freeze drying, Fish protein concentrates, Food irradiation, Food preservation, Food contamination, Seafood, Frozen foods, Fruits, Vegetables.

The cited reports include research on all types of food processing, but primarily cover food irradiation, fish protein processing, and freeze drying. (Contains 95 Abstracts) See also NITS/PS-75/577, Food Processing. Volume 1. 1964-July 1974.

NTIS/PS-75/577/7GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Food Processing. Volume 1. 1964-Jun 74, (A Bibliography with Abstracts).
Rept. for 1964-Jun 74,
Elizabeth A. Harrison. Jul 75, 171p*
See also Volume 2, NTIS/PS-75/576.

Descriptors: *Bibliographies, *Food processing, Freeze drying, Fish protein concentrates, Food irradiation, Food preservation, Food contamination, Seafood, Frozen foods, Fruits, Vegetables.

The selected citations of Federally-sponsored research reports cover fish protein processing, food irridation and freeze drying as well as research on all types of food processing. (Contains 166 abstracts) See also NTIS/PS-75/576, Food Processing Volume 2. July 1974-June 1975.

PAT-APPL-527 398/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Improved Process for Producing an Edible Cottonseed Protein Concentrate.
Patent Application,
Homer K. Gardner, Jr., Robert J. Hron, Sr., and Henry L. E. Vix. Filed 26 Nov 74, 25p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Cottonseed, *Food processing, Proteins, Concentrates, Oilseeds.

The patent application discloses an edible high-protein flour produced by an improved process. Cottonseed meats are dried, and then comminuted in a wide chamber mill having certain specifications which prevent rupturing the pigment glands of the cottonseed. This improvement is correlated with liquid cyclone separation followed by solids recovery steps, thus comprising an improved process which consistently yields an edible cottonseed protein concentrate.

PB-241 948/GA
see prices of individual reports
Informatics, Inc., Rockville, Md.
Scientific Literature Review on Generally Recognized as Safe (GRAS) Food Ingredients.
Final rept. 1920-1974.
1974,16 issues

The Scientific Literature Review summarizes the available scientific literature from 1920 to 1974 related to the safety of food ingredients. Chemical information, biological data, and biochemical aspects are given. For individual reports see below:

FDABF-GRAS-252. Vitamin A. 31 Jan 75, 1080p, PC$27.75, MF$2.25 **PB-241 949/7GA**
FDABF-GRAS-253. Carotenes. 22 Oct 74, 202p, PC$7.25, MF$2.25 **PB-241 950/5GA**
FDABF-GRAS-254. Thiamine. 9 Oct 74, 378p, PC$10.25, MF$2.25 **PB-241 951/3GA**
FDABF-GRAS-255. Niacin. 17 Sep 74, 421p, $10.50, MF$2.25 **PB-241 952/1GA**
FDABF-GRAS-256. Gases in Foods. 16 Oct 74, 138p, PC$5.75, MF$2.25 **PB-241 953/9GA**
FDABF-GRAS-258. Soybean Protein-Isolated. 9 Aug 74, 94p, PC$4.75, MF$2.25 **PB-241 954/7GA**
FDABF-GRAS-259. Tartrates. 1974, 89p, PC$4.75, MF$2.25 **PB-241 955/4GA**
FDABF-GRAS-260. Starches. 21 Nov 74, 191p, PC$7.00, MF$2.25 **PB-241 956/2GA**
FDABF-GRAS-261. Hydrogen Peroxide. 30 Dec 74, 141p, PC$5.75, MF$2.25 **PB-241 957/0GA**
FDABF-GRAS-263. Lactic Acid. 10 Jan 75, 186p, PC$7.00, MF$2.25 **PB-241 958/8GA**
FDABF-GRAS-264. Carbon Dioxide. 20 Jan 75, 208p, PC$7.25, MF$2.25 **PB-241 959/6GA**
FDABF-GRAS-265. Pyridoxine. 8 Aug 74, 274p, PC$8.50, MF$2.25 **PB-241 960/4GA**
FDABF-GRAS-266. Copper Salts. 8 Aug 74, 93 p, PC$4.75, MF$2.25 **PB-241 961/2GA**
FDABF-GRAS-267. Hydrochloric Acid. 26 Jul 74, 64p, PC$4.25, MF$2.25 **PB-241 962/0GA**
FDABF-GRAS-268. Dental Caries and Carbohydrates. 20 Dec 74, 72p, PC$4.25, MF$2.25 **PB-241 963/8GA**
FDABF-GRAS-316. Riboflavin. 31 Oct 74, 272p, PC$8.50, MF$2.25 **PB-241 964/6GA**

PB-241 965/GA
see prices of individual reports
Tracor-Jitco, Inc., Rockville, Md.
Scientific Literature Reviews on Generally Recognized as Safe (GRAS) Food Ingredients.
Final rept. 1920-1974.
1974,8 issues

The Scientific Literature Review summarizes the available scientific literature from 1920 to 1974 related to the safety of food ingredients. Chemical information, biological data, and biochemical aspects are given. For individual issues, see below:

FDABF-GRAS-257. Vitamin B12. 4 Sep 74, 307p, PC$9.25, MF$2.25 **PB-241 966/1GA**
FDABF-GRAS-262. Citric Acid. 17 Oct 74, 144p, PC$5.75, MF$2.25 **PB-241 967/9GA**
FDABF-GRAS-269. Sodium Salts of Fatty Acids. 28 Mar 74, 89p, PC$4.75, MF$2.25 **PB-241 968/7GA**
FDABF-GRAS-270. Ascorbic Acid. 9 Oct 74, 423p, PC$10.50, MF$2.25 **PB-241 969/5GA**
FDABF-GRAS-271. Lecithins. 10 Oct 74, 164p, PC$6.25, MF$2.25 **PB-241 970/3GA**
FDABF-GRAS-272. Urea. 26 Aug 74, 212p, PC$7.25, MF$2.25 **PB-241 971/1GA**
FDABF-GRAS-273. Nickel. 6 Aug 74, 201p, PC$7.25, MF$2.25 **PB-241 972/9GA**
FDABF-GRAS-274. Sodium Chloride, Potassium Chloride. 19 Aug 74, 286p, PC$8.75, MF$2.25 **PB-241 973/7GA**

6J. Industrial (Occupational) Medicine

AD-A011 826/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Effect of Rate of Dosing with Elemental Mercury Vapor on Brain Uptake of Mercury.
Final rept.,
Richard Henderson.
Prepared in cooperation with Olin Corp., New Haven, Conn.

Descriptors: *Brain, *Central nervous system, *Industrial medicine, *Toxicology, Dosage, Exposure(Physiology), Mercury, Vapors, Bioassay, Laboratory animals.
Identifiers: *Mercury poisoning.

Biological variations can account for some of the differences in dose-response that have been reported in the literature on occupational mercurialism. One of the errors in estimating dose has been in the use of calculated time weighted average exposures based on measurements of elemental mercury vapor in the general work environment. Some of the differences in mercury concentrations in the general work environment and in the micro-environment next to contaminated hands and clothing were reported by Henderson (1972). Another error in estimating dose of elemental mercury vapor has been the use of the work time only in calculating time weighted average exposure. If hands and clothing are contaminated with elemental mercury, this contamination can be a source of continuing exposure to elemental mercury vapor for the 16 hours off the job. Another possible source of error in the understanding of the effects of exposure to elemental mercury vapor may result from considering equivalent time weighted average exposures to be equivalent in effect without consideration of the rate of dosing.

AD-A011 854/7GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Organophosphate Pesticides: The Residue Intoxication Problem.
Final rept.,
Robert C. Spear.
Prepared in cooperation with California Univ., Berkeley.

Descriptors: *Intoxication, *Phosphorus compounds, *Pesticides, Industrial medicine, Exposure(Physiology), Physiological effects, Response(Biology), Skin(Anatomy), Dosage, Toxicology, Absorption.
Identifiers: Occupational safety and health, Pesticide residues.

The report presents the results of an investigation into the technical questions surrounding the residue intoxication phenomenon of organophosphate pesticides. It includes the development of relevant sampling techniques and experimental procedures needed to evaluate harvester exposure. Seven field studies have been conducted to study the absorbed doses or physiological responses of exposure to the human body to organophosphate pesticides.

AD-A011 857/0GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Comments on a Plastics Industry Neurotoxicity in Relationship to Methybutyl Ketone.
Final rept.,
Daniel Couri, Lynn B. Hetland, John J. O'Neill, Marie-Frances Ganansia, and Daniel B. Jackson.
Prepared in cooperation with Ohio State Univ., Columbus.

Descriptors: *Plastics industry, *Industrial medicine, *Toxicology, *Nervous system, Ketones, Exposure(Physiology), Pathogenesis, Laboratory animals, Experimental data, Solvents, Inhalation.
Identifiers: *Hexanones, Animal models.

The purpose of these studies was to establish an animal model of peripheral neuropathy in order to demonstrate the etiologic relationship of a volatile solvent to this disease. The inhalational route was used, exposing animals in a modified germ-free apparatus fitted for flow-through concentrations of vapors carried via a

continuous air flow. The study demonstrated that the continuous exposure of animals to MBK can produce leg weakness which progresses to a paralytic neuropathy in chickens, cats and rats, but not mice. Many clinical features of the peripheral neuropathy in the workers were also demonstrable in the animals, for example, muscle weakness, alterations in electromyogram, RBC and serum cholinesterase changes. The histologic changes in animals remain unknown for man since no nerve biopsies were obtained.

AD-A011 859/6GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Cardiac Sensitization Studies in Dogs with Myocardial Infarctions.
Final rept.,
H. J. Trochimowicz, C. F. Reinhardt, L. S. Mullin, A. Azar, and B. W. Karrh.
Prepared in cooperation with Du Pont de Nemours (E.I.) and Co., Wilmington, Del.

Descriptors: *Myocardial infarction, *Halogenated hydrocarbons, *Industrial medicine, Cardiovascular diseases, Epinephrine, Arrhythmia, Exposure(Physiology), Dogs, Laboratory animals, Experimental data.
Identifiers: *Flurohydrocarbons.

In man, myocardial infarction is the most serious form of ischemic cardiovascular disease and, because of its frequent occurrence, it is the single most important type of heart disease. Since myocardial infarction is common in the human population, the authors attempted to determine whether such a condition might place an individual, exposed to high halocarbon concentrations, at greater risk from an epinephrine-induced cardiac arrhythmia. Such exposure conditions could occur in the chemical industry, or in the refrigeration and aerosol industries. Using the dog as an animal model for myocardial infarction, results imply that such an individual, having recovered from myocardial infarction and able to return to work, may be at no greater risk from cardiac sensitization than the normal healthy individual.

AD-A011 997/4GA PC$4.25/MF$2.25
Environmental Health Lab Mcclellan AFB Calif
Health Hazard Potential of HYPOL (Trademark) Polyurethane Prepolymers.
Final rept.,
Marlin L. Sweigart, and Philip Diamond.

Descriptors: *Polyurethane resins, *Isocyanates, *Industrial hygiene, Vapors, Gas analysis, Exposure(Physiology), Hazards, Foam, Gas detectors.
Identifiers: *Isocyanic acid/(methylphenylene-ester), Polyurethane foams, Indoor air pollution, Permissible dosage.

This report presents the results of an evaluation of the potential hazards associated with the use of various formulations of foamable hydrophilic polyisocyanates containing one to two weight percent free toluene diisocyanate (TDI) in Air Force Pacer Foam operations. TDI concentrations and generation rates are presented as well as recommended controls for the use of these prepolymers in foaming operations. Permissible dosage and analysis procedures are also discussed.

PB-227 518/8GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Manufacture of Pulp and Paper.
Final rept.
Aug 51, 65p BLS-Bull-1036
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Paper industry, *Pulp mills, Injuries, Statistical data, Statistical analysis, Paper mills, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of the causes of accidents which resulted in disabling work injuries in the manufacture of pulp and paper during 1948. The study covered all plants manufacturing either pulp or paper, or both. Excluded were plants engeged exclusively in finishing or converting paper manufactured in other establishments. The number of work injuries and related accdents caused by type and geographic location of pulp and paper establishments. The report also contains information about the number of injuries by nature of injury, part of body injured, type of accident, hazardous condition, agency of injury, agency of accident, unsafe act, activity of injured, occupation of injured, and department.

PB-227 519/6GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Manufacture of Paperboard Containers.
Final rept.
Apr 53, 68p BLS-Bull-1139
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Paper industry, Injuries, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of the causes of accidents which resulted in disabling work injuries in the manufacture of paperboard containers during 1950. The study covered setup-box plants, folded-box plants, and fibercan, -tube, and -drum plants. The number of work injuries related accident causes by type and geographic location of paperboard establishments. The report also contains information about the number of injuries by nature of injury, part of body injured, type of accident, hazardous condition, agency (sourcs) of injury, agency of accident, unsafe act, activity of injured, and department.

PB-227 522/0GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in Warehousing Operations.
Final rept.
Jan 55, 60p BLS-Bull-1174
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Warehouses, Injuries, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The results of a study of the causes of accidents which resulted in disabling work injuries in warehousing operations during 1950 are reported. The study covered all establishments which provide storage facilities for hire (public warehouses only) throughout the United States, except Alaska and Hawaii. The number of work injuries and related accident causes by type and geographic location of warehousing operations are included. The report also contains information about the number of injuries by nature of injury, part of body, type of accident, hazardous condition, agency of injured, agency of accident, unsafe act, activity of injured, occupation of injured, and department.

PB-227 523/8GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries and Work-Injury Rates in Hospitals.
Final rept.
Feb 58, 63p BLS-Bull-1219
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Hospitals, Injuries, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health.

The report contains the results of a study of disabling work injuries which occurred in hospitals during 1953. The study covered establishments providing hospital facilities -- both government and nongovernment. Excluded were institutions such as sanatoria, rest homes, convalescent homes, etc. The report includes injury frequency and severity rates by size (number of employees) and geographic location of hospitals. Rate information for selected occupations is also provided. The report also contains information about the number of injuries by nature of injury, part of body injured, and department.

PB-227 524/6GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries in Atomic Energy, 1967.
Final rept.
Dec 69, 21p BLS-359
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Nuclear energy, Personnel, Injuries, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health.

This report presents injury frequency and severity rates during 1967 for employees of privately owned and operated establishments in the atomic energy field. Government owned, privately operated establishments engaged in atomic energy work were excluded from the survey. Employees who spent less than half of their time in atomic energy work also were excluded. Accident experience in the atomic energy field is compared with that of industry generally.

PB-227 525/3GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Boilershop-Products Industry.
Final rept.
Nov 58, 73p BLS-Bull-1237
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Boilers, Industrial plants, Injuries, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health, *Boilershops.

The bulletin contains the results of a study of the causes of accidents which resulted in disabling injuries in the boilershop-products industry during 1951. Data were collected through personal visits by Bureau representatives to 136 boilershop-products plants. Information about the activity of injured, nature of injury, part of body affected, source of injury, type of accident, hazardous condition, unsafe act and product are presented. Descriptions of 57 typical accidents with recommendations for preventing them are included.

PB-227 526/1GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Fatal Work Injuries in Shipyards 1943 and 1944.
Final rept. 1943-44.
1945, 20p BLS-Bull-839
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Shipyards, Injuries, Mortality, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

A total of 655 occupational deaths which occurred in shipyards during 1943 and 1944 were included in this study. Information about the numbers of injuries by nature of injury, part of body injured, source of injury, accident type, hazardous condition, unsafe act, and occupation is presented.

PB-227 527/9GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injury Experience in Atomic Energy 1965 and 1966.
Final rept.
1967, 13p BLS-334
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Nuclear energy, Injuries, Personnel, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health.

The report presents injury frequency and severity rates during 1965 and 1966 for employees of privately owned and operated establishments in the atomic energy field. Government owned, privately operated establishments engaged in atomic energy work were excluded from the survey. Employees who spent less than half of their time in atomic energy work also were excluded. Accident experience in the atomic energy field is compared with that of industry generally.

PB-227 528/7GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries in Atomic Energy, 1969.
Final rept.
1971, 18p BLS-385
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Nuclear energy, Injuries, Personnel, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health.

The report presents injury frequency and severity rates during 1969 for employees of privately owned and operated establishments in the atomic energy field. Government owned, privately operated establishments engaged in atomic energy work were excluded from the survey. Employees who spent less than half of their time in atomic energy work also were excluded. Accident experience in the atomic energy field is compared with that of industry generally.

PB-227 529/5GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Brewing Industry, 1944.
Final rept.
1946, 73p BLS-Bull-884
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Injuries, Personnel, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health, *Brewing industry.

The report contains the results of a study of the causes of accidents which resulted in disabling injuries in breweries during 1944. Information about nondisabling injuries in one large brewery was also obtained. The report contains injury frequency and severity rates by department in which employed, geographical location of plant, and size (number of employees) of plant. Information about the number of injuries by nature of injury, part of body injured, agency (source of injury), accident type, hazardous condition, and unsafe act is presented. Descriptions of 80 typical accidents with recommendations for preventing them are included.

PB-227 530/3GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Accident-Record Manual for Industrial Plants.
1944, 23p BLS-Bull-772
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Personnel, Injuries, Industrial plants, Records management, Methodology, Manuals, Data processing.
Identifiers: *Occupational safety and health.

The report describes simple and useful methods of accident recordkeeping, including which injuries to count, how to measure exposure to injury, and how to calculate injury and severity rates. The manual also gives suggestions on evaluating and using work-injury data.

PB-227 531/1GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries and Work Injury Rates in Hospitals.
Final rept.
May 68, 66p BLS-340
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Hospitals, *Industrial accidents, Personnel, Injuries, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering.
Identifiers: *Occupational safety and health.

The results of a study of disabling injuries which occurred in hospitals during 1963 are reported. Nonprofit, proprietory, and government operated hospitals were included in the study. The report includes injury frequency and severity rates by type and geographic location of hospitals, and by hospital department. Rate information for selected occupations is also provided. The report also contains information about the number of injuries by nature of injury and part of body injured.

PB-227 533/7GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in Carpentry Operations.
Final rept. 1948-49.
1952, 63p BLS-Bull-1118
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Carpentry, *Industrial accident, Injuries, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering, Personnel.
Identifiers: *Occupational safety and health.

Presented are the results of a study of the causes of accidents which resulted in disabling injuries to carpenters. Over 9,000 records of disabling injuries in the files of 9 State workmen's compensation agencies were examined. All injuries occurred during 1948 or 1949. Descriptions of 74 typical accidents with recommendations for preventing them are included. Statistical tables contain information about the number of injuries by part of body injured, agency (source) of injury, type of accident, hazardous working condition, unsafe act, and activity of injured at time of injury.

PB-227 534/5GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Occupation Hazards and Diagnostic Signs.
Final rept.
Sep 33, 64p BLS-Bull-582
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Occupational diseases, *Industrial accidents, Personnel, Hazards, Industries, Industrial medicine, Signs and symptoms, Manuals.
Identifiers: *Occupational safety and health, Irritant compounds.

The manual contains the lists: hazardous occupations cross-indexed to hazards of occupation, symptoms and occupations classified by the hazard of occupation, and skin irritants classified by occupations which are commonly exposed.

PB-227 535/2GA PC$4.75/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Foundry Industry, 1942.
Final rept.
1945, 70p BLS-Bull-805
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Foundries, Industries, Personnel, Injuries, Hazards, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of the causes of accidents which resulted in disabling injuries in foundries during 1942. Both ferrous and non ferrous foundries as well as foundry departments of establishments in other industry groups were included in the survey. The report contains injury frequency and severity rates by department, geographical location of plant, and size (number of employees) of plant. Information about the number of injuries by nature of injury, part of body injured, agency (source) of injury, accident type, hazardous condition, unsafe act, and occupation is resented. Descriptions of 67 typical accidents with recommendations for preventing them are included.

PB-227 536/0GA PC$3.75/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in Plumbing Operations.
Final rept. 1948-49.
1952, 40p BLS-Bull-1079
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Plumbing, Injuries, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of the causes of accidents which resulted in disabling injuries to plumbers, apprentice plumbers, plumber's helpers, and plumbing supervisors. Over 2,700 records of disabling injuries in the files of 13 State workmen's compensation agencies were examined. All injuries occurred during 1948 or 1949. Descriptions of 61 typical accidents with recommendations for preventing them are included. Statistical tables contain information about the number of injuries by nature of injury, part of body injured, agency (source of injury), type of accident, hazardous working condition, unsafe act, activity of injured at time of injury, and location of accident (on floors, on ladders, etc.).

PB-227 537/8GA PC$3.75/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries to Crewmen on Inland Waterways.
Final rept.
1951, 29p BLS-Special Ser-5

Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Naval personnel, Naval operations, Injuries, Statistical data, Statistical analysis, Safety engineering, Inland waterways, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of work injuries which occurred during 1946 to crew members of commercial vessels operating on the inland waterways. The report includes injury frequency and severity rates by type of vessel, kind of power used, geographic area of operation, and occupation. The report also contains information about the number and percentage distribution of disabling and medical treatment injuries by nature of injury, part of body injured, agency (source) of injury, accident type, hazardous condition, and unsafe act.

PB-227 538/6GA PC$5.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Standardization of Industrial Accident Statistics.
Final rept.
Dec 20, 105p BLS-Bull-276
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Injuries, Statistical analysis, Statistical data, Methodology, Standards.
Identifiers: *Occupational safety and health.

The bulletin combines and summarizes material which appeared in the reports of the Committee on Statistics and Compensation Insurance Cost of the International Association of Industrial Accident Boards and Commissions during the years 1915-1919. It is an important source of information about the development and standard definitions and accident reporting practices, the classification of accident causes, and the methods of computing injury frequency and severity rates.

PB-227 539/4GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Slaughtering and Meat-Packing Industry 1943.
Final rept.
1946, 64p BLS-Bull-855
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Meat, Food processing, Personnel, Injuries, Statistical data, Statistical analysis, Industrial hygiene, Safety engineering, Prevention.
Identifiers: *Occupational safety and health, *Meat packing plants.

Presented are the results of a study of the causes of accidents which resulted in disabling injuries in the slaughtering and meat-packing industry during 1943. Information about nondisabling injuries in three plants was also obtained. The report contains injury frequency and severity rates by department in which employed, geographical location of plant, and size (number of employees) of plant. Information about nature of injury, part of body injured, agency (source) of injury, type of accident, hazardous condition, and unsafe act is also presented. Descriptions of 68 typical accidents with recommendations for preventing them are included.

PB-227 540/2GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries in Atomic Energy, 1968.
Final rept.
1970, 19p BLS-378
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Nuclear energy, Industrial plants, Injuries, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

Injury frequency and severity rates during 1968 for employees of privately owned and operated establishments in the atomic energy field are presented. Government owned, privately operated establishments engaged in atomic energy work were excluded from the survey. Employees who spent less than half of their time in atomic energy work also were excluded. Accident experience in the atomic energy field is compared with that of industry generally.

PB-227 546/9GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Shipyard Injuries, 1944.
Final rept.
1945, 13p BLS-Bull-834
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Shipyards, Personnel, Injuries, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

A substantial reduction in the volume of work injuries occurred during 1944 as a result of a sustained safety program. Injury frequency rates by geographical location of the yard and by type of construction are presented. The report also contains information about the numbers of injuries by nature of injury, part of body injured, source of injury, accident type, hazardous condition, and unsafe act.

PB-227 547/7GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injuries and Accident Causes in the Longshore Industry, 1942.
Final rept.
1944, 56p BLS-Bull-764
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Longshore operations, Injuries, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The report contains the results of a study of the causes of accidents which resulted in disabling injuries in the longshore industry during 1942. The report contains injury frequency and severity rates by occupation and geographical location. Information about the number of injuries by nature of injury, part of body injured, agency (source) of injury, type of accident, hazardous condition, unsafe act, age, place of accident (on board ship, on dock, etc.) and nature of work (handling cargo, handling dunnage, etc.) is presented. Descriptions of 49 typical accidents with recommendations for preventing them are included.

PB-227 554/3GA PC$3.75/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Work Injuries and Work-Injury Rates in the Highway and Street Construction Industry, 1961.
Final rept.
1963, 43p BLS-257
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Construction industry, Highways, Roads, Injuries, Personnel, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Highway construction, *Occupational safety and health.

Presented are the results of a study of disabling work injuries which occurred in the highway and street construction industry during 1961. The study covered general contractors primarily engaged in the construction of roads and streets throughout the United States, except Alaska and Hawaii. The report included injury frequency and severity rates by size (number of employees) and geographic location of construction sites. Information regarding kind of construction and rates for selected occupations is also provided. The report also contains information about the number of injuries by nature of injury and part of body injured.

PB-227 555/0GA PC$3.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Injury Rate Variations in the Boilershop-Products Industry, 1951.
Final rept.
1953, 20p BLS-28
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, Personnel, Boilers, Industrial plants, Injuries, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health, *Boilershops.

Presented are the results of a study of disabling injuries which occurred in the boilershop-products industry during 1951. The report includes injury frequency and severity rates by size (number of employees) of plant, principal product produced, geographic location of the plant, and department.

PB-227 556/8GA PC$7.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Manual on Industrial-Injury Statistics.
Final rept.
1940, 211p BLS-Bull-667
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Workmens compensation, Injuries, Statistical data, Statistical analysis, Management.
Identifiers: *Occupational safety and health.

The bulletin replaces Bulletin No. 276. Chapters on administration, compensation, and accident statistics describe the major aspects of worker's compensation agency statistical programs. A more adequate first report of injury form is proposed. Extensive coding lists are included in the manual.

PB-227 591/5GA PC$4.25/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Woodworking. Circular-Saw Accidents.
Final rept. 1951-52.
Jan 56, 74p BLS-Bull-1190
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Sawmills, *Industrial accidents, Personnel, Sawing, Woodworking, Injuries, Safety engineering, Industrial hygiene, Statistical data, Statistical analysis.
Identifiers: *Occupational safety and health.

The report contains the results of a study of over 1,200 accidents which involved circular saws. Portable circular saws and large circular saws used in sawmills were excluded. State safety inspectors investigated any accident within the scope of the study which they found in the course of performance of their regular duties. Only accidents which occurred during 1951 or 1952 were included. Information about the number of injuries by nature of injury, part

of body injured, agency (source) of injury, type of accident, hazardous condition, unsafe act, and activity of injured (feeding, off bearing, etc.) is presented. Descriptions of 22 typical accidents with recommendations for preventing them are included.

PB-242 222/8GA PC$10.25/MF$2.25
Westinghouse Electric Corp., Columbia, Md. Behavioral/Safety Center.
An Evaluation of Policy Related Research on Effectiveness of Alternative Methods to Reduce Occupational Illness and Accidents,
C. Michael Pfeifer, Jr., Monica H. Schaeffer, Craig B. Grether, Joseph L. Stefanski, and Thomas C. Tuttle. Jul 74, 397p NSF/RA/S-74-035
Contract NSF-C829

Descriptors: *Occupational diseases, *Accident prevention, Industrial accidents, Industrial psychology, Reviews, Evaluation, Industrial medicine, Accidents, Bibliographies, Policies, Safety engineering, Information retrieval, Tables(Data), Human factors engineering, Bibliographies.
Identifiers: *Occupational safety and health.

The report summarizes the results of a comprehensive literature review and evaluation of research on alternative strategies for reducing occupational illness and accidents. Several approaches were used to locate literature, including professional and automated search services, manual searches, etc. Each reference surviving the screening process was evaluated with regard to internal validity, external validity, and policy utility using a six-point scale. Ten percent of the articles were rated independently by a second reviewer as a check on reliability. Reliability of ratings was not a problem, and minor discrepancies were resolved by group discussion. Critical reviews of the literature are presented for six general approaches to accident and illness reduction: behavioral approaches, occupational health approaches, applied ergonomics, occupational biomechanics, systems engineering approaches, and investigative and statistical approaches.

PB-242 577/5GA PC$4.25/MF$2.25
Naval Ammunition Depot, Crane, Ind.
Feasibility Study of Portable Calibration Instrumentation for Audio Dosimeters.
Final rept.,
David Montgomery. 13 Dec 74, 69p NAD-CR-RDTR-289 BuMines-OFR-41-75
Contract S0144091

Descriptors: *Dosimeters, *Acoustic measuring instruments, Calibrating, Portable equipment, Feasibility, Industrial medicine.

The feasibility of building a calibrator for the DuPont D-100 audio dosimeter is discussed. The desired specifications are used as guidelines but the possibility of their relaxation is also considered. Commercially available equipment is surveyed and found to not satisfy the guidelines. Several alternate concepts are investigated, and recommendations for further work are presented.

PB-242 754/0GA PC$3.75/MF$2.25
Bureau of Labor Statistics, Washington, D.C.
Shipyard Injuries and Their Causes, 1941.
Final rept.
1943, 50p BLS-Bull-722
Also available in set of 56 reports as PB-243 125-SET, PC$161.00, MF$45.00.

Descriptors: *Industrial accidents, *Shipyards, Personnel, Injuries, Statistical data, Statistical analysis, Safety engineering, Industrial hygiene.
Identifiers: *Occupational safety and health.

The results of a study of the causes of accident which resulted in disabling injuries in privately operated shipyards during 1941 are reported. The study was restricted to yards which customarily construct or repair vessels of 150 feet or more in length. The report contains injury frequency and severity rates by shipyard department, size of yard (number of employees) geographical location, kind of shipyard operation performed, and month, day of week and shift during which injury occurred. Information about nature of injury, part of body injured, agency (sources) of injury, accident type, hazardous condition, and unsafe act is presented. Descriptions of 33 typical accidents with recommendations for preventing them are included.

PB-243 125-SET/GA PC$161.00/MF$45.00
Bureau of Labor Statistics, Washington, D.C.
Special Industry and Accident Cause Studies of the Bureau of Labor Statistics, 1940-1970.
1970, 3169p-in 56v

Descriptors: *Industrial accidents, *Occupational diseases, Methodology, Injuries, Industrial medicine, Industrial hygiene, Safety engineering, Statistical data, Statistical analysis.
Identifiers: *Occupational safety and health.

The publications contain information valuable to those engaged in research or statistical analysis of occupational safety and health data. In addition to their historic interest, these publications contain the only information about occupational injury rates and accident causes ever published for particular industries on a national basis. Of the total of 56 microfiche in the set, 4 describe the statistical methodology used. The set includes PB-224 127, PB-224 128, PB-224 132, PB-224 133, PB-224 151-PB-224 153, PB-224 156, PB-224 166-PB-224 169, PB-224 186, PB-224 196-PB-224 198, PB-224 214, PB-224 215, PB-224 232-PB-224 240, PB-224 387, PB-226 695, PB-227 518, PB-227 519, PB-227 522-PB-227 532, PB-227 533-PB-227 540, PB-227 546, PB-227 547, PB-227 554-PB-227 556, PB-227 591, and PB-242 754.

6K. Life Support

AD-A011 903/2GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Glucose Homeostasis of Man in Helium-Oxygen at 1-50 Atmospheres Absolute.
Medical research progress rept.,
Larry W. Raymond, Jonas Sode, William P. Spaur, David E. Uddin, and Roger Johnsonbaugh. Oct 74, 12p
Availability: Pub. in Undersea Biomedical Research, v1 n4 p325-334 Dec 74.

Descriptors: *Glucose, *Homeostasis, *Humans, *Divers, Helium, Oxygen, Hyperbaric conditions, Hyperoxia, Reprints.

Divers who inhabit hyperbaric, hyperoxic atmospheres of helium-oxygen (He-O2) are said to exhibit hypoglycemia, rather than the glucose intolerance observed in men exposed to hypobaric hyperoxia, simulated weightlessness, or other environmental stresses. Serum concentrations of glucose, insulin, and growth hormone were measured following the usual overnight fast, in teams of 5 to 10 men who were chronically exposed to He-O2 in hyperbaric chambers at pressures equivalent to 75, 300, 1000, and 1600 fsw. The fasting serum glucose concentration in hyperbaric He-O2 was often lower than pre-exposure values in air (P=0.20, 0.01, 0.02 and 0.01, respectively). Most of this lowering in serum glucose levels was due to artifacts incurred during decompression of the blood samples, as indicated by in vitro studies. Serum glucose was within the normal range in all dives and serum insulin concentrations generally reflected normal glucose-insulin homeostasis. Fasting concentrations of growth hormone were also normal in all dives, with the exception of the first morning at 1600fsw, at which time the concentration was increased to 10.6 + or - 4.2 ng/ml(SE), in the presence of marked neurological dysfunction. There was thus no evidence of 'hyperbaric hypoglycemia' in these experimental conditions. Lengthy decompression of blood samples probably accounts for the apparent lowering of serum glucose concentrations sometimes reported under such conditions. Neuroglucopenia appears to be unlikely as an explanation for the high pressure nervous syndrome. In the 1600fsw dive subjects, this syndrome was associated with a transient rise in serum growth hormone, the mechanism of which is unexplained.

N75-24360/0GA PC$9.50/MF$2.25
Hamilton Standard, Windsor Locks, Conn.
Phase 1 Engineering and Technical Data Report for the Thermal Control Extravehicular Life Support System.
Mar 75, 329p NASA-CR-141793, HSPC-75.TO5
Contract NAS9-13574

Descriptors: *Extravehicular activity, *Life support systems, *Space shuttles, *Temperature control, Manned space flight, Moisture, Pressure, Systems engineering, Tables (Data), Thermoregulation, Water management.

For abstract, see STAR 1315

6L. Medical and Hospital Equipment

AD-A011 919/8GA PC$3.75/MF$2.25
Dynatech R/D Co Cambridge Mass
Development of a Synthetic Polymer Burn Covering.
Progress rept. 1 Jan-1 Jun 75,
Arthur D. Schwope, and Donald L. Wise. 30 Jun 75, 41p Rept no. Dynatech-1300
Contract N00014-73-C-0201
See also AD-765 341.

Descriptors: *Burns(Injuries), *Protective coverings, Surgical supplies, Rats, In vivo analysis, Medical supplies, Models, Freeze drying, Therapy, Permeability, Collagen, Skin(Anatomy), Transplantation, Laboratory animals, Experimental data, Laminates.
Identifiers: *Biomaterials, Furanone/ethyldihydro, Evaluation.

Laboratory and preliminary in vivo (burned rat model) testing of a freeze-dried collagen/poly-caprolactone film laminate (FDC/PCL) and a freeze-dried poly-caprolactone foam/poly-caprolactone film laminate (PCL foam/film) as wound coverings have been completed. Porcine skin has also been evaluated in vivo. The laminates are flexible and, when moistened, become somewhat transparent permitting observation of the wound. Early adherence of both coverings to the wound was realized. The force required to remove the PCL foam/film laminate from a full thickness excision wound increased from 170 dynes/sq. cm. on the first day post graft to 1500 dynes/sq. cm. by the tenth day. The force required to remove FDC/PCL laminates remained constant, 220 dynes/sq. cm., over the ten day test period. Insensible water loss rates from animals grafted with the laminates were similar to that from animals with human cadaver skin grafts. Color illustrations reproduced in black and white.

AD-A011 972/7GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 Fpo New York 09527
A Modified Liquid Medium for Leishmania.
Technical scientific rept.,
N. S. Mansour, J. Hady, and E. McConnell. 1973, 7p Rept no. NAMRU-3-TR-45-74

Availability: Pub. in Jnl. of Parasitology, v59 n6 p1088-1090 Dec 73.

Descriptors: *Leishmania, *Culture media, Modification, Cultures(Biology), Liquids, Hemolysis, Blood, Rabbits, Parasites, Density, Reprints.

A liquid medium modified from the NIH diphasic medium, originally designed for trypanosomes but also used for Leishmania culture, differs mainly in the absence of agar and the substitution of hemolyzed blood for defibrinated or citrated whole rabbit blood. It is easier to prepare and requires less blood. Freeze-dried preparations of the medium proved to be equally suitable. (Author)

AD-A012 055/0GA PC$3.25/MF$2.25
Naval Blood Research Lab Chelsea Mass
Blood Components in the Treatment of Acute Blood Loss: Use of Freeze-Preserved Red Cells, Platelets, and Plasma Proteins,
C. R. Valeri. 21 Dec 73, 15p
Availability: Pub. in Anesthesia and Analgesia. Current Researches, v54 n1 p1-14 Jan-Feb 75.

Descriptors: *Blood preservation, Freezing, Blood platelets, Blood plasma, Blood proteins, Erythrocytes, Separation, Preparation, Blood banks, Blood transfusion, Hemorrhage, Reprints.

To avoid untoward reactions from blood transfusions and to make best use of the limited supply of blood, anesthesiologists and surgeons have many newly developed means at their disposal. Blood components should be separated from whole blood at the time of collection and prepared for either liquid or freeze-preservation. Citrate-phosphate-dextrose (CPD) blood should be separated into its components at room temperature within 4 hours of collection for greatest service from each collected unit. Red cell concentrates with hematocrits of 70 volumes percent can be prepared from the whole blood at the time of collection and frozen either shortly thereafter or after storage at 4 C for up to 3 weeks. Redcell levels of 2.3-diphosphoglycerate (2,3-DPG) and adenosine triphosphate (ATP) can be increased by a rejuvenation process prior to freeze-preservation with either 40% W/V glycerol and storage at -80 C or with 20% W/V glycerol and storage at -150 C. While hermorrhagic shock can best be managed with fresh whole blood, such blood is often not available; liquid- and freeze-preserved products serve as best substitutes.

AD-A012 082/4GA PC$3.25/MF$2.25
Lankenau Hospital Philadelphia Pa
Experimental Evaluation of Woven Polylactic Acid, Polyester Tubes as Trachael Prostheses.
Scientific rept. no. 3 (Final) 1 Aug 71-1 Jan 75,
Paul A. Thomas. 1 Mar 75, 11p
Contract DADA77-72-C-2009
See also report no. 2 dated 10 Aug 73, AD-767 305.

Descriptors: *Prosthetics, *Trachea, *Polyester fibers, Experimental data, Laboratory animals, Surgical implantation, Dogs, Rabbits, Respiratory system, Histology, Biological material.
Identifiers: *Biomaterials, *Poly(lactic acid), Tissue compatible materials.

Woven tubes of either polyester fibers or mixed polyester, polylactic acid fibers of appropriate sizes were prepared for substitution of the rabbit and dog trachea. Limited but significant survival of rabbits was achieved postimplantation using both types of woven tubes. Tissue acceptance of the woven tube prostheses was studied histologically after subcutaneous implantation in rabbits. Polylactic acid fibers were observed to increase in size and decrease in staining intensity early after implantation and finally disappear. Cellular reactivity and fibroplasia was greater in specimens containing polylactic acid fibers as compared with those containing polyester fibers. It is concluded from these experiments that a mechanically suitable prosthetic tube can be fabricated for tracheal substitution by weaving but that tissue healing with intraluminal epithelial resurfacing is inhibited by the occurrence of implant infection which results in lumen obstruction.

N75-24316/2GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Some Procedural Problems in Automatic Analysis of Electrocardiograms.
N. S. Molchanov, and L. V. Chireykin. 19 May 75, 19p NASA-TT-F-16357
Contract NASW-2481
Tran-Transl. Into English from Kardiologiya, (Ussr) V. 14, No. 3, Mar. 1974 p 141-147.

Descriptors: *Data processing, *Diagnosis, *Electrocardiography, Biometrics, Computer techniques, Heart diseases, Signal analysis.

For abstract, see STAR 1315

N75-24336/0GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Fast and Easy Production of Monolayer Plaque Assay Slides.
G. D. Majoor, M. B. Vantveer, and O. B. Zaalberg. 1974, 7p MBL-1974-31, TDCK-65564

Descriptors: *Antibodies, *Assaying, *Surface layers, Adhesives, Cells (Biology), Tapes.

For abstract, see STAR 1315

N75-24355/0GA PC$3.25/MF$2.25
Technische Hogeschool, Delft (Netherlands). Man-Machine Systems Group.
On the Acceptance, Functional Gain and Mental Load in ARM Prosthesis and Orthosis Control.
M. Soede, J. S. M. J. Vandieten, and H. G. Stassen. Nov 74, 20p WTHD-66

Descriptors: *Arm (Anatomy), *Mental performance, *Prosthetic devices, Clinical medicine, Psychological effects, Training devices.

For abstract, see STAR 1315

PAT-APPL-576 504/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Inflight Intravenous Bottle Holder.
Patent Application,
M. E. Wilson. Filed 12 May 75, 14p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Medical equipment, Inflight, Aeromedical evacuation, Parenteral infusions, Patents, Bottles, Holders.
Identifiers: PAT-CL-248-327, *Patent applications.

The patent application discloses a bottle holder assembly adapted for use as an inflight intravenous bottle holder aboard an aircraft on an aeromedical airlift mission. The holder comprises: a cradle, generally configurated in the form of an inverted 'T', with an upper and a lower end and with a slot in each end, and with each end bent backwardly; a hook removably connected to the upper end; and, a strap subassembly attached to the cradle and suitably configurated and dimensioned to accept a standard intravenous bottle which is in the inverted, operative position. The intravenous bottle holder is removably attachable to, and slideably movable along, any one of the plurality of conventional litter support straps which such an aircraft is equipped.

PAT-APPL-577 133/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Tone Count Audiometric Computer.
Patent Application,
C. R. Meyer. Filed 13 May 75, 12p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Computer applications, *Audiometry, *Bioinstrumentation, Measurement, Hearing, Thresholds(Physiology), Patents, Test equipment.
Identifiers: PAT-CL-179-1-N, *Patent applications.

The patent application relates broadly to hearing level testing devices and in particular to a tone count audiometric computer apparatus for automatically determining hearing threshold levels.

6M. Microbiology:

AD-A011 843/0GA PC$3.25/MF$2.25
Northwestern Univ Chicago Ill Dept of Microbiology
Structure and Biological Activity of the Streptococci.
Final rept.,
Hutton D. Slade. 27 Jun 75, 7p
Contract N00014-67-A-0356-0025

Descriptors: *Streptococcus, Immunology, Polysaccharides, Microbiology, Antigens, Metabolism, Mutations, Biology, Pathogenic microorganisms, Cells(Biology), Polymers, Antibodies, Dental caries.

Studies on the polysaccharide cell wall antigens of the streptococci has provided information on the methods of extraction, chemical composition and structure, relation of antigenic specificity to structure, and the biological activity of such polysaccharides. In the latter case it is shown that such polysaccharides serve as binding sites for enzymes which synthesize high molecular weight polymers from sucrose. These polymers are essential for adherence of the streptococcal cell to glass surfaces. It is shown that antibody to the polysaccharide will prevent the binding of the enzyme to the streptococcal cell surface and consequently adherence of the cells. These results present a possible mechanism of the adherence of the streptococcal cell to the smooth surfaces of teeth.

AD-A011 882/8GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Silicoflagellates and Ebridians from Leg 31.
Technical rept.,
Hsin Yi Ling. 1973, 15p Rept nos. TR-332, Contrib-776
Contract Nonr-477(37), Grant NSF-GA-40142X
Availability: Pub. in Initial Reports of the Deep Sea Drilling Project, v31 p763-777 1975.

Descriptors: *Micropaleontology, *Protozoa, Marine biology, Ocean bottom, Sampling, North Pacific Ocean, Japan Sea, Reprints.
Identifiers: *Silicoflagellates, *Ebridians.

Only a few works have been carried out from the western Pacific submarine deposits on the subject of silicoflagellates and ebridians. Therefore, Leg 31 of the Deep Sea Drilling Project provided a unique opportunity to examine their abundance and biostratigraphic occurrences of the area. The sites drilled, 13 in total, fall into three geographic areas; namely, Philippine Basin, southwest of Japan, and the Japan Sea. Accordingly, the results on occurrences of silicoflagellates and ebridians at each site are grouped in the respective areas. The

procedures of sample preparation and the methods used for designating the location of illustrated specimens in the strewn slides as well as relative abundance of taxa in each sample are essentially the same as previously described in the Leg 19 report (Ling, 1973). All the microslides used for the present investigation, including the figured specimens, will be deposited permanently in the Micropaleontology Collection of the Department of Oceanography, University of Washington.

AD-A011 975/0GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Chemistry
Infinite-Dilution Viscoelastic Properties of Tobacco Mosaic Virus.
Norio Nemoto, John L. Schrag, John D. Ferry, and Robert W. Fulton. 20 Sep 74, 11p ARO-9479.19-C
Grant DA-ARO-D-31-124-71-G75
Distribution: Pub. in Biopolymers, v14 p409-417 1975.

Descriptors: *Viruses, *Viscoelasticity, Solutions(Mixtures), Dilution, Polymers, Viscoplastic properties, Reprints.
Identifiers: *Tobacco mosaic virus.

AD-A012 123/6GA PC$3.25/MF$2.25
Naval Medical Field Research Lab Camp Lejeune N C
T-Strain Mycoplasmas and Reproductive Failure in Monkeys.
Interim rept.,
Ruth B. Kundsin, Thelma Rowell, Maurice C. Shepard, Angeles Parreno, and Carl D. Lunceford. 31 Dec 74, 7p Rept no. NMFRL-Vol-XXV-No-9
Availability: Pub. in Laboratory Animal Science, v25 n2 p221-224 Apr 75.

Descriptors: *Mycoplasma, *Fertility, Monkeys, Females, Strains(Biology), Reproduction(Physiology), Reduction, Pathogenic microorganisms, Infections, Reprints.
Identifiers: T-mycoplasma, Abortion.

T-strain mycoplasmas were isolated from the genital tracts of three genera of female monkeys: the talapoins, Miopithecas talapoin, the patas, Erythrocebus patas, and the macaques, Macaca fascicularis. The talapoins have not reproduced successfully for the past two years. Fertility in the patas has also been reduced, with a high incidence of stillbirths and spontaneous abortions. The macaques were not permitted to breed. (Author)

AD-A012 159/0GA PC$4.75/MF$2.25
Army Natick Development Center Mass
Microbiological Evaluation of the Food Service System at Travis Air Force Base.
Technical rept.,
Gerald J. Silverman, Edmund M. Powers, David F. Carpenter, and Durwood B. Rowley. Apr 75, 79p NDC-TR-75-110-FSL

Descriptors: *Microbiology, *Sanitation, Food, Air Force, Sterilization, Monitoring, Tables(Data), Safety, Temperature, Bacteria.
Identifiers: *Food sanitation, Food processing, Food preparation, Recommendations, Evaluation, *Food services management, Training programs.

Microbiological evaluation studies were conducted prior and subsequent to a modification of the Travis AFB feeding system. Innovations included the introduction of new processing equipment, a specialty meal, a chilled and frozen food operation which included a remote reconstitution facility, centralized preparation of raw salads, a modular fast food facility and a limited training program for personnel. The initial study indicated certain shortcomings in the microbiological quality of the menu items, in sanitation and in the proper preparation and serving of either cooked or chilled foods. As shown in the second study on the modified feeding system, improvements were obtained in the microbiological quality of the cooked items, in the tossed salad operation and in general sanitation. Appropriate recommendations are made for further improvement in the microbiological and sanitary quality of the feeding operation.

AD-A012 327/3GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
New Method of Grouping Beta-Hemolytic Streptococci Directly on Sheep Blood Agar Plates by Coagglutination of Specifically Sensitized Protein A-Containing Staphylococci.
Final rept.,
E. A. Edwards, and G. L. Larson. 26 Aug 74, 6p
Availability: Pub. in Applied Microbiology v28 n6 p972-976 Dec 74.

Descriptors: *Microbiology, *Streptococcus, *Blood platelets, Sheep, Identification, Proteins, Agglutinins, Polysaccharides, Mixing, Reprints.
Identifiers: *Beta-Hemolytic streptococci, *Straphylococcus aureus, Sheep Blood Agur Plates.

A technique is described that allows the grouping of beta-hemolytic streptococci directly upon the primary colony. This was accomplished by applying a small drop of specifically sensitized protein A-containing Staphylococcus aureus over a colony of streptococci, rocking the plate to allow mixing of the particles with the soluble group-specific polysaccharide, which in the case of beta-hemolytic streptococci was produced in abundance during colony formation, and observing for agglutination of the sensitized particles. Such a simple test for group A beta-hemolytic streptococci should allow accurate identification of group A streptococci in small laboratories, such as in clinics of physicians' offices, as well as in the larger public health and private laboratories. (Author)

AD-A012 389/3GA PC$3.75/MF$2.25
Maine Univ Orono Dept of Civil Engineering
Investigation to Increase the Viricidal Capacity of Disinfectant, Germicidal and Fungicidal, Phenolic, Dry-Type.
Final rept. 3 May 73-28 Feb 75,
Otis J. Sproul. Feb 75, 46p NDC-TR-75-90-FSL
Contract DAAG17-73-C-0190

Descriptors: *Germicides, *Polioviruses, Surface active substances, Effectiveness, Viruses, pH factor.
Identifiers: *Disinfectants, Viricides.

The straight O-D-1435 Type II disinfectant had little capacity to inactivate the poliovirus type I when used in concentrations up to 15,000 mg/l with contact times up to 24 hours. The Coxsackie A9 and Echo 12 viruses showed no inactivation with 10,000 mg/l of disinfectant and contact times of 30 minutes. An increase of the pH to more than 12 did potentiate the disenfectant for poliovirus inactivation. The survival at a pH of 12.1 with 10,000 mg/l of disinfectant was less than 0.01 percent after 5 minutes of contact. The survival at this pH without the disinfectant was 58%. Anionic surfactants in concentrations from 100 to 10,000 mg/1 had little capacity for increasing the viricidal capacity of the disinfectant. Cationic and nonionic surfactants had no enhancement ability.

N75-24293/3GA PC$4.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Soyuz-16: Biological Experiments.
B. Gerasimov. 19 May 75, 51p NASA-TT-F-16356
Contract NASW-2481
Tran-Transl. Into English from Various Russian Articles.

Descriptors: *Bioastronautics, *Soyuz spacecraft, Actinomycetes, Botany, Embryology, Microbiology, Rhythm (Biology), Vestibules.

For abstract, see STAR 1315

N75-24294/1GA PC$3.25/MF$2.25
Naval Biomedical Research Lab., Oakland, Calif.
Studies on Propagation of Microbes in the Airborne State.
Annual Report, 1974-1975.
R. L. Dimmick, H. Wolochow, and M. A. Chatigny. 1975, 6p NASA-CR-142757, QPR-4
Contract NASW-13450

Descriptors: *Aerosols, *Escherichia, *Reproduction (Biology), Cell division, Microbiology, Microorganisms, Mitosis.

For abstract, see STAR 1315

N75-24296/6GA PC$3.25/MF$2.25
Naval Biomedical Research Lab., Oakland, Calif.
Studies on Possible Propagation of Microbial Contamination in Planetary Atmospheres.
Quarterly Report, 1 Feb. - 30 Apr. 1975.
R. L. Dimmick, H. Wolochow, and M. A. Chatigny. 30 Apr 75, 5p NASA-CR-142825, QR-1
NASA ORDER W-;3450
Subm-Prepared in Cooperation with Calif. Univ., Berkeley.

Descriptors: *Contamination, *Microorganisms, *Planetary atmospheres, Aerosols, Airborne infection, Anaerobes, Bacteriophages, Deoxyribonucleic acid, Escherichia.

For abstract, see STAR 1315

N75-24311/3GA PC$3.75/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Punctuation of Transcription in Vitro of the Tryptophan Operon of Escherichia Coli. A Novel Type of Control of Transcription.
H. Pannekoek, W. J. Brammar, and P. H. Pouwels. 1975, 37p MBL-1975-4, TDCK-65817

Descriptors: *Bacteriophages, *Positive feedback, *Regulators, *Ribonucleic acids, *Tryptophan, Biosynthesis, Deoxyribonucleic acid, Escherichia, Genetic code, Messages, Proteins.

For abstract, see STAR 1315

N75-24312/1GA PC$3.75/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
In Vitro Synthesis of Enzymes of the Tryptophan Operon of Escherichia Coli. Part 2: Studies on the Specificity of Initiation of Transcription.
P. H. Pouwels, and J. Vanrotterdam. 1975, 30p MBL-1975-5, TDCK-65816

Descriptors: *Escherichia, *Genetic code, *Initiation, *Tryptophan, Bacteriophages, Biosynthesis, Deoxyribonucleic acid, Enzymes, Mutations, Regulators, Transducers.

For abstract, see STAR 1315

N75-24313/9GA PC$3.75/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
In Vitro Synthesis of Enzymes of the Tryptophan Operon of Escherichia Coli. Part 3: Evidence for Positive Control of Transcription.
P. H. Pouwels, and J. Vanrotterdam. 1975, 31p MBL-1975-6, TDCK-65818

Descriptors: *Escherichia, *Genetic code, *Positive feedback, *Tryptophan, Biosynthesis, Deoxyribonucleic acid, Enzymes, Regulators.

For abstract, see STAR 1315

N75-24314/7GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
A Changed Atp-Dependent Dnaase: The Characterization of the Enzyme from Escherichia Coli Rora.
B. Vandorp, R. Benne, and F. Palitti. 1974, 24p MBL-1974-38, TDCK-65633
Contract EURATOM-052-65-2-BIAN

Descriptors: *Adenosine triphosphate (Atp), *Enzyme activity, *Nuclease, *Purification, Degradation, Deoxyribonucleic acid, Escherichia, Hydrolysis, Separation.

For abstract, see STAR 1315

N75-24320/4GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Hot Air Sterilization.
G. B. Roemer. Jun 75, 7p NASA-TT-F-16384
Contract NASW-2483
Tran-Transl. Into English from Deut. Med. Wochenschr. (West Germany), V. 13, No. 100, 1975 p 709-710.

Descriptors: *High temperature air, *Sterilization, Bacteria, Medical equipment, Mortality, Pathogens, Spores, Syringes.

For abstract, see STAR 1315

N75-24341/0GA PC$3.75/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Transcription of Bacteriophage mu: An Analysis of the Transcription Pattern in the Early Phase of Development.
C. Wijffelman, and P. Vandeputte. 1974, 29p MBL-1974-36, TDCK-65586

Descriptors: *Bacteriophages, *Genetic code, *Translating, Deoxyribonucleic acid, Directivity, Ribonucleic acids.

For abstract, see STAR 1315

6O. Pharmacology

AD-A012 173/1GA PC$3.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Asymmetrical Cross-Tolerance Between Morphine- and Scopolamine-Induced Antinociception in the Primate.
Technical rept. Sep 73-Aug 74,
Agu Pert, and George Maxey. Jul 75, 12p Rept no. EB-TR-75033

Descriptors: *Morphine, *Scopolamine, *Analgesias, Drugs, Tolerances(Physiology), Cholinergic blocking agents, Thresholds(Physiology), Pain, Pharmacology, Experimental data, Laboratory animals.

Two experiments were designed to explore further the role of the cholinergic system in mediating morphine-induced analgesia in the Rhesus monkey. Experiment 1 tested for cross-tolerance between morphine and scopolamine using the shock titration technique. It was found that tolerance to morphine attenuated the response to scopolamine but that tolerance to scopolamine had no effect on morphine-induced antinociception. In experiment 2, injections of scopolamine and arecoline were made into brain sites which had previously been found to be analgesically responsive to morphine injections. Neither compound was found to be effective in modifying the shock threshold. These findings imply that morphine and scopolamine do not exert their antinociceptive effects through identical neural substrates. The findings from Experiment 1, however, do suggest that there may be some degree of overlap between such substrates.

AD-A012 199/6GA PC$5.75/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Proceedings of the Drug Testing Laboratory Managers Symposium, 28 January - 1 February 1974.
Final rept.,
Edward R. Noe, William A. Romanchick, and Clayton A. Ainsworth, III. Jun 75, 149p Rept no. SAM-TR-75-16

Descriptors: *Radioimmunoassay, *Drug abuse, *Symposia, Laboratory procedures, Automation, Rehabilitation, Test methods, Personnel selection, Diagnosis(Medicine), Quality control, Management, Medical laboratories, Military medicine, Morphine, Barbiturates, Amphetamines, Methaqualone, Cocaine, Psychotherapy, Military personnel, Latex.
Identifiers: *Drug screening, Mass screening techniques, Drug tests, Group therapy.

This report deals with broad concepts of managing mass screening programs for drugs of abuse; e.g., morphine, barbiturate, amphetamine, cocaine, and methaqualone. The interactions of the screening process and of the rehabilitation program were covered. Psychotherapy and group therapy are both utilized in rehabilitation programs. The semiautomated radioimmunoassay (RIA) screening procedures are both sensitive and specific at nanogram quantities. Future evaluations of a wafer disk transferral system and of a latex test for morphine are presented. The unique quality control system employed by military drug abuse testing laboratories is discussed. (Author)

AD-A012 326/5GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Effect of Elevated Atmospheric Pressure on Antibiotic Susceptibility of Staphylococcus Aureus and Streptococcus Pyogenes.
Medical research progress rept.,
N. A. Schlamm. 10 Apr 72, 4p
Availability: Pub. in Antimicrobial Agents and Chemotherapy, v1 n6 p512-513 Jun 72.

Descriptors: *Staphylococcus aureus, *Streptococcus pyogenes, *Antibiotics, Hyperbaric conditions, Pressurization, Penicillins, Tetracyclines, Sodium compounds, Tolerances(Physiology), Helium, Oxygen, Mixtures, Reprints.
Identifiers: Vancomycin, Cephalothin, Colistimethate, Susceptibility(Biology).

Staphylococcus aureus showed decreased susceptibility to penicillin, vancomycin, sodium cephalothin and tetracycline, but increased susceptibility to sodium colistimethate, at a pressure of 68 atm in helium or helium-oxygen gas. Susceptibility of streptococcus pyogenes was unchanged by pressurization. (Author)

6P. Physiology

AD-A011 753/1GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Sleep Stage Deprivation and Total Sleep Loss: Effects on Sleep Behavior.
Julie M. Moses, Laverne C. Johnson, Paul Naitoh, and Ardie Lubin. 22 Jan 74, 9p Rept no. 74-17
Availability: Pub. in Phychophysiology, v12 n2 n141-146 1975.

Descriptors: *Sleep, *Humans, *Rapid eye movement in sleep, Deprivation, Recovery, Behavior, Reprints.

The combined effects of total sleep loss and the deprivation of stage 4 or stage REM were studied in two separate experiments. Two full nights of sleep loss preceded stage 4 deprivation or stage REM deprivation in Experiment 1 (N=12); one full night of sleep loss followed three nights of stage 4 deprivation or stage REM deprivation in Experiment 2 (N=14). Total sleep loss before sleep stage deprivation significantly increased the number of attempts to enter stage 4, but had little influence on stage REM. A REM rebound was found in only one of the REM-deprived groups, but there was a stage 4 rebound in all groups on the first full recovery night, supporting the hypothesis from other studies that stage 4 has priority over REM in terms of recovery from sleep loss. The results suggested that stages 2, 3, and 4 partially overlap in their recuperative functions. (Author)

AD-A011 892/7GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
Combined Effects of Elevated Pressures of Nitrogen and Oxygen on Operant Performance.
Medical research progress rept.,
J. R. Thomas. Jul 74, 9p
Availability: Pub. in Undersea Biomedical Research, v1 n4 p363-370 Dec 74.

Descriptors: *Respiration, *Narcosis, Hyperbaric conditions, Nitrogen, Oxygen, Helium, Partial pressure, Interactions, Conditioned response, Rats, Performance, Behavior, Discrimination, Time, Reprints.
Identifiers: *Inert gas narcosis, Nitrogen narcosis.

Low rates of behavior generated by a differential-reinforcement-of-low-rate reinforcement schedule increased systematically with increases in nitrogen partial pressures but not with similar increases in helium partial pressures. Increased partial pressures of oxygen potentiated the rate-increasing effects of nitrogen, and the interactive effects of oxygen were more pronounced the higher the pressures of nitrogen. Nitrogen-produced disruptions in temporal discrimination reflected similar nitrogen-oxygen interactions. (Author)

AD-A011 893/5GA PC$3.25/MF$2.25
Naval Medical Research Inst Bethesda Md
The Effects of Increased Gas Density on Pulmonary Mechanics.
Medical research progress rept.,
J. Vorosmarti, M. E. Bradley, and N. R. Anthonisen. 1975, 12p
Availability: Pub. in Undersea Biomedical Research, v2 n1 p1-10 Mar 75.

Descriptors: *Pulmonary function, *Saturation diving, Lung function tests, Divers, Oxygen, Helium, Nitrogen, Neon, Mixtures, Gas exchange(Biology), Density, Hyperventilation, Volume, Flow rate, Resistance, Work measurement, Performance(Human), Reprints.
Identifiers: Breathing gases.

Pulmonary function was studied in seven U.S. Navy divers on two Helium-oxygen saturation dives to 19.1 and 26 ATA. Volume, flow, and transpulmonary pressure were measured during quiet breathing hyperventilation, and forced expiratory vital capacity maneuvers. The measurements were made at different depths using He-O2, N2-O2, and Ne-O2 mixtures to provide a range of relative gas densities between 0.43 and 15. The changes in forced expiratory volume and average peak expiratory flow rate confirmed previous investigators' results. Maximum midexpiratory flow rate did not decrease when relative gas density was higher than 5. Inspiratory airway resistance increased with gas density but was closely similar during quiet breathing and hyperventilation. Expiratory airway resistance also increased with gas density and was significantly higher during hyperven-

tilation than during quiet breathing. At 26 ATA the subjects respired 50 liters/min without undue stress but flow-resistive work of breathing was greatly increased. The problems of using this type of study to predict the depth to which divers will be able to do useful work are discussed. (Author)

AD-A011 970/1GA PC$3.25/MF$2.25
Naval Medical Research Unit No 3 Fpo New York 09527
Autoantibodies in Schistosomal Liver Fibrosis.
Technical scientific rept.,
S. Bassily, Y. Z. Mohran, M. I. Said, M. Moussa, and F. Iskander. 1973, 7p Rept no. NAMRU-3-TR-42-74
Availability: Pub. in Jnl. of Tropical Medicine and Hygiene, v76 p153-155 Jun 73.

Descriptors: *Antibodies, *Schistosomiasis, *Liver diseases, *Autoimmunization, Liver, Reprints.

Thirty-five patients with pathologically proven advanced schistosomal liver fibrosis were tested for autoantibody reactivity. Six patients (17 per cent) showed autoimmune reactions as shown by complement fixation test and agar diffusion reaction. Five of these six patients also had chronic salmonella bacteraemia, and the sixth patient had hepatitis associated antigen and combined schistosomal and post-necrotic cirrhosis. The importance of microbial antigen in initiating the autoimmune reaction is suggested. (Author)

AD-A012 027/9GA PC$4.25/MF$2.25
New Mexico Univ Albuquerque Dept of Anatomy
Studies of Orientational and Postural Mechanisms in a Model Neural System.
Final rept. 1 Feb 73-1 Feb 75,
Leo S. Demski, and Diana H. Bauer. Feb 75, 53p AFOSR-TR-75-0829
Grant AF-AFOSR-2491-73

Descriptors: *Orientation(Direction), *Vestibular apparatus, *Eye movements, *Brain, Central nervous system, Nervous system, Physiology, Electrophysiology, Laboratory animals, Experimental data.
Identifiers: *Neurophysiology.

Utilizing eye movements as a measure of vestibular activity, regions of the brain involved in their control and in possible mediation of postural and orientational responses have been studied through electrical stimulation of the brain in anesthetized animals. A mapping of the brain has been accomplished. Experiments performed on chronically implanted animals indicate that stimulation of the brain in areas associated with eye movements in the anesthetized subject in most cases produces a postural change which could be predicted from the eye movements of the manually positioned animal. Therefore, the areas of the brain related to movements identified in the earlier studies are probably also involved in more complex postural and orientational responses.

AD-A012 045/1GA PC$3.25/MF$2.25
Naval Health Research Center San Diego Calif
Heart Rate Preceding Motility in Sleep.
Richard E. Townsend, Laverne C. Johnson, Paul Naitoh, and Alain G. Muzet. 1975, 6p Rept no. 73-37
Availability: Pub. in Psychophysiology, v12 n2 p217-219 Mar 75.

Descriptors: *Sleep, *Heart, *Rapid eye movement in sleep, Bodies, Motion, Psychophysiology, Reprints.
Identifiers: Body movement.

Heart rate (HR) increases before movement in sleep have been attributed to vascular congestion resulting from maintenance of a constant body position for a long period of time. An alternative hypothesis is that movements during sleep may be regulated by sleep-stage-specific arousal factors. The HR changes preceding spontaneous and tone-evoked movements were compared in stage 2 and rapid eye movement sleep. The results indicated that within a sleep stage similar HR increases, beginning approximately eight seconds before movement onset, precede both spontaneous and tone-evoked movements. The results suggest that the Hr acceleration before spontaneous movement is not related to body position or vascular congestion, but may be triggered by internal stimuli within the eight seconds before the movement. The strong negative relationship between baseline HR and magnitude of HR acceleration before movement onset suggests that the HR acceleration may be related to maintenance of special organ blood flow. (Author)

AD-A012 238/2GA PC$3.75/MF$2.25
Hektoen Inst for Medical Research Chicago Ill
The Manufacture and Study of Stroma Free Hemoglobin Solution.
Annual summary rept. no. 16, 1 Sep 74-31 Aug 75,
Gerald S. Moss. 25 Jul 74, 34p
Contract DADA17-71-C-1106

Descriptors: *Hemoglobin, *Blood substitutes, In vivo analysis, Erythrocytes, Blood transfusion, Oxygen, Baboons, Primates, Laboratory animals, Experimental data.
Identifiers: *Oxygen transport mechanisms, Stroma.

Stroma free hemoglobin solution (SFH) has been proposed as a blood substitute for the purposes of acute resuscitation because of its unique ability to transport oxygen. The fact that SFH has a strongly left shifted oxygen dissociation curve raises questions about its ability to unload oxygen. The object of our study is to characterize the in vivo oxygen unloading properties of SFH in baboons, in the absence of circulating red blood cells.

AD-A012 275/4GA PC$7.00/MF$2.25
Texas Univ At Austin Bio-Medical Engineering Research Lab
Sleep-Wakefulness Determinations from Heart Rate Data.
Interim rept. 1 May 74-30 Apr 75,
Mike Lisenby, P. C. Richardson, and A. J. Welch. 15 Jun 75, 185p Rept no. TR-173
Contract DAMD17-74-C-4081

Descriptors: *Sleep, *Heart, *Alertness, Mathematical models, Tables(Data), Rapid eye movement in sleep, Regression analysis, Cycles, Automation.
Identifiers: Sleep stages.

In recent years a number of projects related to the automated classification of levels of alertness have been conducted in the Bio-Medical Engineering Program. All of these projects were designed with a common goal in mind: the development of a process by which rapid, inexpensive determinations of levels of alertness could be performed accurately using an easily derived physiologic parameter such as beat-by-beat heart rate. By combining procedures and results of these previous studies a conglomerate algorithm can be developed which has all the necessary capabilities. One of the primary goals was achieved: the reduction of cost, volume, and complexity in automated classification of levels of alertness. It was felt that improvements can be made which will provide substantial progress toward fulfilling the remainder of the goals: the development of an automated process for the accurate determination of levels of alertness.

N75-24318/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Spinal Effects of an Electrical Vestibular Stimulation in Man.
M. Lacour, M. Bonnet, and J. P. Roll. May 75, 23p NASA-TT-F-16314
Contract NASW-2483
Tran-Transl. Into English from Acta Oto-Laryngol. (Uppsala), V. 78, No. 5-6, 1974 p 399-409.

Descriptors: *Electric stimuli, *Physiological responses, *Spine, *Vestibules, Efferent nervous systems, Human body, Neurophysiology, Proprioception, Reflexes.

For abstract, see STAR 1315

N75-24322/0GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
The Testing of Peripheral Vision.
H. Snellen, and E. Landolt. May 75, 37p NASA-TT-F-16312
Contract NASW-2483
Tran-Transl. Into English from the Mono. "Handbuch der Gesammten Augenheilkunde" Leipzig, W. Engelmann, V. 3, 1874 p 52-71.

Descriptors: *Ophthalmology, *Peripheral vision, Brightness, Color vision, Eye (Anatomy), Test equipment.

For abstract, see STAR 1315

N75-24323/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
On Rod Visual Acuity and Cone Visual Acuity.
A. E. Fick. May 75, 24p NASA-TT-F-16315
Contract NASW-2483
Tran-Transl. Into English from Arch. Ophtalmol. (Berlin), V. 45, 1898 p 336-356.

Descriptors: *Color vision, *Light adaptation, *Visual acuity, Graphs (Charts), Retina, Tables (Data), Thresholds (Perception).

For abstract, see STAR 1315

6Q. Protective Equipment

AD-A012 314/1GA PC$4.25/MF$2.25
Synsis Inc Los Angeles Calif
Prototype Cold Weather Headwear.
Final rept. Oct 73-Oct 74,
David Mangelsdorf, Marvin Goldberg, and Heidi Santschi. Oct 74, 73p USA-NLABS-TR-75-42-CEMEL, CE/MEL-137
Contract DAAK03-74-C-0030

Descriptors: *Protective clothing, *Headgear, *Cold weather operations, Protection, Frostbite, Wind, Cold weather tests, Snow, Wounds and injuries, Compatibility, Clothing, Urethanes, Permeability.

Prototypes of an improved cold weather headgear ensemble have been developed which should provide protection from cold, wind, blowing snow, and frostbite in environments to -65F and 35 miles per hour wind velocities. The ensemble provides physical compatibility with military clothing and equipment and does not occlude the field of vision. The design covers the face, head and neck and is provided with features that permit achieving varying degrees of protection in response to varying severity of the environmental threat. The ensemble and its elements is composed largely of a helenca/urethane foam/cotton jersey laminate which provides excellent insulating properties, sound transparency, and permeability.

6R. Radiobiology

AD-A012 339/8GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
Report on NRL Measurements as a Participant in the INDI.
Final rept.,
F. H. Attix, R. B. Theus, S. G. Gorbics, and C. C. Rogers. May 75, 27p Rept no. NRL-MR-3051

Descriptors: *Dosimetry, *Luminescent dosimeters, *Gamma rays, *Neutrons, Thermoluminescence, Radiotherapy, Tissues(Biology), Simulation, Neutron spectrum, Monte Carlo method, Dosage, Radiobiology, International, Scientific research, Calcium fluorides, Lithium fluorides, Manganese, Cesium, Radioactive isotopes.
Identifiers: INDI(International neutron dosimetry intercomparison), Thermoluminescent dosimeters.

NRL was invited to participate in the International Neutron Dosimetry Intercomparison (INDI) which took place during 1973 at the Raiological Research Accelerator Facility of Brookhaven National Laboratory, under the sponsorship of the International Commission on Radiation Units and Measurements. The source was a D-T generator of 15.5-MeV neutrons. Measurements were made only along the extended axis of the deutron beam; at 30 cm in free space, and at depths of 5, 10, and 20 cm in a 30 cm cubic water phantom positioned with its input face 20 cm from the neutron source. A 1-cc tissue-equivalent (TE) ion chamber was used with TE gas or air flowing through it to measure the total n+gamma dose in tissue, with appropriate corrections. Thermoluminescent dosimeters were employed to measure the gamma-ray dose component, assuming that the n/gamma sensitivity ratio measured in the NRL neutron beam (approx. 15 MeV average energy) was appropriate to the free-space measurement for the INDI. The gamma-ray dose component at 30 cm from the target is negligible in free space, probably not exceeding a few tenths of a percent of the total dose there. Within the phantom it is necessary to make a correction to the (n/gamma) sensitivities of the TLD's to account for the degradation of neutron energy with depth. The neutron spectrum at 5 cm, 10 cm, and 20 cm depth has been estimated by Herling through Monte Carlo calculations.

N75-24329/5GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
The Influence of Ionizing Radiation on the Immune Response de Invloed van Radioactieve Straling OP Immunologische Afweermechanismen.
O. Brocadeszaalberg. 1974, 17p MBL-1974-28, TDCK-65585
In Dutch; English Summary.

Descriptors: *Gamma rays, *Immunity, *Physiological responses, *Radiation damage, *X rays, Cells (Biology), Human body, Stimulation.

For abstract, see STAR 1315

N75-24332/9GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Properties of Uvre Mutants of Escherichia Coli K12. Part 1: Effects of Uv Irradiation on DNA Metabolism.
C. A. Vansluis, I. E. Mattern, and M. C. Paterson. 1974, 21p MBL-1974-25, TDCK-65293
Subm-Sponsored Partly by Med. Res. Council of Can.

Descriptors: *Deoxyribonucleic acid, *Metabolism, *Mutations, *Ultraviolet radiation, Dimers, Enzyme activity, Escherichia, Pyrimidines, Radiation effects.

For abstract, see STAR 1315

N75-24333/7GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Properties of Uvre Mutants of Escherichia Coli K12. Part 2: Construction and Properties of Pol and Rec Derivatives.
I. E. Mattern, and P. C. Houtman. 1974, 22p MBL-1974-26, TDCK-65294

Descriptors: *Escherichia, *Mutations, *Radiation tolerance, *Ultraviolet radiation, *Viability, Nuclease, Radiation effects, X rays.

For abstract, see STAR 1315

N75-24334/5GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Radiosensitization of Biologically Active DNA in Cellular Extracts by Oxygen. Evidence That the Presence of SH-Compounds Is Not Required.
J. J. Vanhemmen, W. J. A. Meuling, and J. F. Bleichrodt. 1974, 22p MBL-1974-29, TDCK-65368

Descriptors: *Augmentation, *Deoxyribonucleic acid, *Oxygen, *Radiation damage, Bacteriophages, Gamma rays, Sensitivity.

For abstract, see STAR 1315

N75-24335/2GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
Mutagenesis by Ultraviolet Radiation in Bacteriophage phi X 174: On the Mutation Stimulating Processes Induced by Ultraviolet Radiation in the Host Bacterium.
J. F. Bleichrodt, and W. S. D. Verheij. 1974, 23p MBL-1974-30, TDCK-65367

Descriptors: *Bacteriophages, *Escherichia, *Mutations, *Ultraviolet radiation, Deoxyribonucleic acid, Radiation effects.

For abstract, see STAR 1315

6S. Stress Physiology

AD-A011 964/4GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Response of Local Vascular Volumes to Lower Body Negative Pressure Stress,
Roger A. Wolthuis, Adrian LeBlanc, William A. Carpentier, and Stuart A. Bergman, Jr. 1975, 8p Rept no. SAM-TR-75-243
Availability: Pub. in Aviation, Space and Environmental Medicine, v46 n5 p697-702 May 75.

Descriptors: *Negative pressure, *Vascular diseases, *Response(Biology), Radioactive isotopes, Serum albumin, Reprints.
Identifiers: Environmental medicine, Lower body.

The present study involved an intravenous injection of radioactive iodinated serum albumin, equilibration of this isotope within the vascular space, and the continuous measurement of isotope activity over selected anatomical areas before, during and following multiple human LBNP tests. Both rate magnitude of vascular pooling were distinctly different within each of five selected lower body anatomical areas. In the upper body, all areas except the abdomen showed depletions from their resting vascular volumes during LBNP. The presence of uniquely different pooling patterns in the lower body, the apparent stability of abdominal vascular volumes, and a possible decrease in cerebral blood volume during LBNP represent the major findings of this study. (Author)

AD-A012 061/8GA PC$7.00/MF$2.25
Indiana Univ Bloomington Dept of Anatomy and Physiology
Physiological Adjustments to Environmental Factors.
Final rept. 1 Sep 73-31 Aug 74,
Howard H. Rostorfer. 31 Aug 74, 199p AFOSR-TR-75-0171
Grant AF-AFOSR-2383-72
See also report dated 13 Dec 72, AD-753 913.

Descriptors: *Adaptation(Physiology), *Heat stress(Physiology), Body temperature, Sense organs, Stress(Physiology), Physiological effects, Atmospheric temperature, Sweat glands, Performance(Human), Acclimatization, Environments, Work, Response(Biology), Cells(Biology).
Identifiers: Mechanoreceptors, Thermoregulation.

The following conclusions are considered warranted by the investigators: (1) There is an increase in the sensitivity of the thermoregulatory centers in the hypothalmus following heat acclimation; (2) there is no increase in the peripheral sensitivity of the reflex sweating mechanism with heat acclimation; (3) the human body undergoes significant physiological adaptation during heat acclimation; (4) the heat acclimation process is limited by the amount of work and heat stress imposed giving only partial adaptation to more severe conditions; and (5) there were training effects associated with the heat acclimation process. The interactive human performance model written at the Department of Human Physiology, University of California, Davis, and originally implemented on a Burroughs B6700 has been adapted to run interactively on the CDC 6600 at Indiana University.

AD-A012 099/8GA PC$4.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Principles of Biodynamics. Volume II. Experimental Procedures in Gravitational Biology.
Aeromedical Review,
Clarence F. Kelly, and Arthur H. Smith. Nov 74, 52p Rept nos. SAM-Review-9-74, SAM-TR-74-45
See also Volume 1, AD-A003 624.

Descriptors: *Biodynamics, *Gravity, *Acceleration tolerance, *Weightlessness, Stress(Physiology), Aerospace medicine, Experimental design, Laboratory animals.
Identifiers: Gravitation.

Gravitational-biology experimental procedures depend upon limitations of field effect (e.g., buoyancy or recumbency) or modifications of field strength with inertial forces (e.g., Earth-orbital vehicles or centrifuges). For protracted experimentation on Earth, investigators faced many variables for constructing and operating animal-centrifugation devices, and a few critical requirements for safety and reliability. These are reviewed to benefit investigators contemplating research in gravitational biology.

AD-A012 172/3GA PC$3.25/MF$2.25
Army Aeromedical Research Lab Fort Rucker Ala
Effects of Oxygen and Reduced Glutathione on the Oxygen Consumption of Mouse Liver.
Final rept.,
Dennis A. Baeyens, and Mary J. Meier. May 75, 15p Rept no. USAARL-75-20

Descriptors: *Stress(Physiology), *Hyperbaric conditions, *Oxygen consumption, Glutathione, Mice, In vitro analysis, Liver, Enzymes, Toxicity, Peptides, Metabolism, Exposure(Physiology).

Identifiers: Hyperbaric oxygenation, Oxygen toxicity.

The effects of hyperbaric oxygen tensions on the oxygen consumption of mouse liver homogenates was investigated. Hyperbaric oxygen rapidly inhibits the oxidative metabolism of the mammalian liver. Mouse liver homogenate exposed to a PO2 of 3837.8 mm Hg for 30 minutes showed a 50.6% reduction in oxygen consumption compared to controls exposed to nitrogen at ambient pressure. The effect of reduced glutathione (GSH) as a protective agent against hyperbaric oxygen toxicity was also examined. Liver homogenates pretreated with GSH and exposed to high oxygen tensions demonstrated greater activity than untreated controls. It is concluded that: (1) GSH protects important enzymes of oxidative metabolism by keeping them in a reduced and viable state, and (2) GSH can stimulate oxygen consumption by increasing succinate formation through a GSH-succinate shunt.

N75-24324/6GA PC$7.50/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Problems of Space Biology. Volume 26: Statistical Analysis of the Cardiac Rhythm and Hemodynamic Indices in Physiological Research.
A. D. Voskresenskiy, and M. D. Venttsel. May 75, 234p NASA-TT-F-16196
Contract NASW-2481
Tran-Transl. Into English of the Book "Problemy Kosmicheskoy Biologii. Tom 26. Statisticheskiy Analiz Serdechnogo Ritma I Pokazateley Gemodinamiki V Fiziologicheskikh Issledovaniyakh" Moscow, Nauka Press, 1974 p 1-221.

Descriptors: *Cardiology, *Exobiology, *Hemodynamic responses, *Statistical analysis, Carbon dioxide, Digital systems, Hypoxia, Orthostatic tolerance.

For abstract, see STAR 1315

N75-24326/1GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Effects of Muscular Exercise on Variation in Plasma Cortisol and Glucose in Normal Males.
M. Follenius, and G. Brandenberger. May 75, 18p NASA-TT-F-16257
Contract NASW-2483
Tran-Transl. Into English from the Eur. J. Appl. Physiol., (France) No. 33, 1974 p 23-33.

Descriptors: *Blood plasma, *Cortisone, *Exercise (Physiology), *Glucose, *Muscular tonus, Adrenal gland, Ergometers, Hormones, Human factors engineering, Males, Pituitary gland.

For abstract, see STAR 1315

N75-24327/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Role of Metabolic Shifts in the Pathogenesis of Vestibular Disturbances.
Y. F. Udalov, and E. V. Lapayev. Jun 75, 6p
NASA-TT-F-16431
Tran-Transl. Into English from Voyenno-Med. Zh. (Ussr), No. 10, Oct. 1974 p 64-66.

Descriptors: *Metabolism, *Pathogenesis, *Vestibules, Acceleration tolerance, Amino acids, In-flight monitoring.

For abstract, see STAR 1315

N75-24361/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Center for Technical Submarine Studies and Research.
Jun 75, 10p NASA-TT-F-16385
Contract NASW-2483
Tran-Transl. Into English from Descriptive Brochure (France) p 1-18.

Descriptors: *Submarines, *Underwater engineering, Confinement, Environmental tests, Exploration, Life support systems, Oceanography.

For abstract, see STAR 1315

6T. Toxicology

AD-A011 858/8GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Cardiophysiological Studies with Stressed Animals.
Final rept.,
Robert T. Drew, and George J. Taylor. Dec 74, 18p Rept no. AMRL-TR-74-125-Paper-8
Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, N.C.

Descriptors: *Toxicology, *Stress(Physiology), *Cardiovascular system, *Propellants, Heart, Physiological effects, Laboratory animals, Cardiology, Experimental data, Arrhythmia, Hypoxia, Hamsters, Rabbits, Exposure(Physiology), Response(Biology), Pathology.
Identifiers: *Methane/chloro-trifluoro.

The report presents data that show trifluorochloromethane (F-11) is more toxic to cardiomyopathic hamsters than to random-bred hamsters, and that the toxicity is qualitatively different as well. It was also shown in another species that the arrhymic potential of F-11 is increased by hypoxia and the arrhythmias observed are not the result of hypoxia alone. The data from these animal studies are not directly applicable to humans. Genetic cardiomyopathy is not presented as a model of human heart disease or even human cardiomyopathy. The acute hypoxia induced in rabbits is not representative of the acute hypoxic state of the patient with diseases such as asthma or respiratory failure. These data show only that animals with depressed physiologic reserve were more sensitive to F-11 than normal animals.

AD-A011 860/4GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Chronic Toxicity of JP-4 Jet Fuel.
Final rept.,
Edwin R. Kinkead, Louis C. DiPasquale, Edmond H. Vernot, and James D. MacEwen. Dec 74, 14p Rept no. AMRL-TR-74-125-Paper-11
Prepared in cooperation with California Univ., Irvine.

Descriptors: *Toxicology, *Jet engine fuels, Dosage, Thresholds(Physiology), Pathology, Histology, Exposure(Physiology), Hydrocarbons, Laboratory animals, Hematology, Benzene, Dogs, Monkeys, Bioassay, Vapors.
Identifiers: Occupational safety and health, JP-4 fuel.

Accidental overexposure of workers to JP-4 vapors indicated the need for a Threshold Limit Value (TLV) for this jet fuel based on experimental data. A lack of animal toxicity information necessitated the design of a test to define the chronic toxic effects of low levels of JP-4 vapors on several species of laboratory animals. Toxicity data from this study could then be used either to predict safe exposure levels or provide input for the design of a subsequent test to determine an industrial TLV for JP-4. Application of this TLV would serve to prevent health hazards to those individuals charged with handling JP-4 jet fuel either in storage or in the field. Based on these data, it is suggested that workmen should not be allowed to inhale more than 2.5 mg/liter JP-4 vapors for extended periods of time, i.e., eight hours a day, 5 days per week. It must be emphasized that this standard recommendation is only an estimate based on the available experimental data and is subject to modification following a more detailed examination of the histopathological results.

AD-A011 861/2GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Toxic Hazards Evaluation of New Air Force Fire Extinguishing Agents.
Final rept.,
Ethard W. Van Stee, Alan M. Harris, Michael L. Horton, and Kenneth C. Back. Dec 74, 22p Rept no. AMRL-TR-74-125-Paper-12

Descriptors: *Fire extinguishing agents, *Toxicology, Toxic agents, Toxic hazards, Halogenated hydrocarbons, Alkanes, Cardiovascular system, Central nervous system, Pathology, Physiology, Ecology, Carcinogens, Bioassay, Laboratory animals.
Identifiers: Fluroalkanes.

Major technical areas discussed include ecosystem modeling, water pollution, water reuse, toxic hazards evaluation of fire extinguishants, environmental carcinogenesis, and cellular toxicology.

AD-A011 862/0GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Identification of Environmental Carcinogens.
Final rept.,
Elizabeth K. Weisburger. Dec 74, 17p Rept no. AMRL-TR-74-125-Paper-13
Prepared in cooperation with the National Cancer Inst., Bethesda, Md.

Descriptors: *Carcinogens, *Toxicology, Environments, Identification, Physicochemical properties, Chemical analysis, Bioassay, Laboratory animals, Hydrocarbons, Amines, Nitrosamines, Asbestos, Air pollution, Water pollution.
Identifiers: *Air pollution effects(Humans), *Water pollution effects(Humans).

Although approximately 6000 compounds have been tested for long term toxicity or carcinogenicity in laboratory animals, only about 3% of these have been active in animals. In humans only 20 to 30 compounds seem to be environmental carcinogens. However, in the past, it has been the unfortunate fact that the effects of most environmental carcinogens were first detected in exposed persons, rather than in laboratory animals. Therefore, it is of utmost importance both to identify any new compounds which may be carcinogenic in animals and to increase the speed, accuracy, and reliability of the physico-chemical determination of such materials - essentially a problem in analytical chemistry. Examples of possible environmental carcinogens are given.

AD-A011 863/8GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Mechanisms of Carcinogenesis by Nitroso Compounds.
Final rept.,
Peter N. Magee. Dec 74, 13p Rept no. AMRL-TR-74-125-Paper-14
Prepared in cooperation with Middlesex Hospital Medical School, London (England).

Descriptors: *Carcinogens, *Nitroso compounds, *Toxicology, Cancer, Neoplasms, Pathogenesis, Environments, Laboratory

animals, Experimental data, Response(Biology), Chemicals.

The formation of carcinogenic nitrosamines from amines and nitrites in the body has been demonstrated, and tumours have been induced by simultaneous administration of these materials to experimental animals. A number of drugs, pesticides and other environmental chemicals have secondary or tertiary amino structures and various amines occur in food. Nitrites are present in various vegetables and are added to certain foods as preservatives. Nitrates, which are found in drinking water, can be reduced to nitrites in the body and nitrites are present in human saliva. It is clear, therefore, that any amine in the stomach may be nitrosated, and perhaps give rise to a carcinogenic nitrosamine.

AD-A011 864/6GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Recent Advances in the Toxicology of N-Nitroso and Hydrazine Compounds.
Final rept.,
Ronald C. Shank. Dec 74, 21p Rept no. AMRL-TR-74-125-Paper-15
Prepared in cooperation with California Univ., Irvine.

Descriptors: *Nitroso compounds, *Hydrazine derivatives, *Toxicology, Nitrosamines, Amines, Toxicity, Carcinogens, Metabolism, Amides, Organic nitrogen compounds.

The toxicity and metabolism of N-nitroso compounds and hydrazines are discussed. Carcinogeneity is also treated.

AD-A011 865/3GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
The Effects of 6-Month Chronic Low Level Inhalation Exposures to Hydrazine on Animals.
Final rept.,
J. D. MacEwen. Dec 74, 19p Rept no. AMRL-TR-74-125-Paper-16
Prepared in cooperation with California Univ., Irvine.

Descriptors: *Toxicology, *Hydrazine, Thresholds(Physiology), Bioassay, Laboratory animals, Central nervous system, Exposure(Physiology), Physiological effects, Dosage, Inhalation, Mortality rates, Histology, Pathology, Neoplasms.

To compare the effects of repeated 6 hour per day, 5 day per week (industrial type) exposures with continuous exposures of equivalent concentrations and to evaluate the safety factor of the current threshold limit value (TLV), four concentration levels were selected for the 26-week exposure of four animal species. The concentrations selected were: 1.0 ppm and 0.2 ppm for continuous exposures and 5.0 ppm and 1.0 ppm for intermittent daily exposures. The effects of chronic inhalation of hydrazine are dose related regardless of the nature of exposure, i.e., intermittent or continuous. The highest hydrazine dose caused approximately 40% deaths in mice within the first two months of exposure while the TLV dose equivalents caused approximately 5% mortality.

AD-A011 866/1GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Evaluation of Experimental Data for Assessing Carcinogenic Risk for Man.
Final rept.,
Ralph C. Wands, and Joan H. Broome. Dec 74, 28p Rept no. AMRL-TR-74-125-Paper-17
Prepared in cooperation with National Academy of Sciences, Washington, D.C.

Descriptors: *Carcinogens, *Toxicology, Cancer, Environments, Dosage, Chemical compounds, Bioassay, Laboratory animals, Neoplasms, Humans.

The track record of toxicology in predicting chemically induced cancer in man is examined. The intention is to identify what lessons might be learned that would lead to improved predictions and, perhaps, to greater applications of carcinogenicity testing. Data are reviewed from animals experimentation and human experience for several well-known carcinogenic compounds. The extent of the match between the two sets of data is noted. The compounds chosen for this study are ones upon which there are extensive studies and which also are of current interest.

AD-A011 867/9GA PC$3.75/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Suitability of Animal Species and Strains for Testing Carcinogenic Risk for Man.
Final rept.,
Paul M. Newberne. Dec 74, 33p Rept no. AMRL-TR-74-125-Paper-18
Prepared in cooperation with Massachusetts Inst. of Tech., Cambridge.

Descriptors: *Carcinogens, *Toxicology, Dosage, Chemicals, Pathogenesis, Laboratory animals, Cancer, Neoplasms, Response(Biology), Experimental data, Exposure(Physiology).
Identifiers: *Animal models.

Testing for the safety of chemicals to which human population groups are exposed requires animals, and important considerations in such studies include the choice of animal model(s), the diet, housing and handling and the interpretation of results. Chemicals may be administered in the diet, by gastric intubation, by intraperitoneal injection, intratracheal intubation, by aerosol or by other means. The most practical route by exposure, in keeping with safety, is that which is closest to the manner in which humans may be exposed. The authors have explored the use of a number of species of laboratory animals in carcinogenesis studies and selected examples are discussed in this paper. Problems associated with the use of mice in safety evaluations are alluded to and the use of animal studies to identify potential human carcinogens is pointed out.

AD-A011 868/7GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Statistical Models for Estimating Carcinogenic Risks from Animal Data.
Final rept.,
David G. Hoel. Dec 74, 9p Rept no. AMRL-TR-74-125-Paper-19
Prepared in cooperation with National Inst. of Environmental Health Sciences, Research Triangle Park, N.C.

Descriptors: *Carcinogens, *Toxicology, Environments, Dosage, Exposure(Physiology), Predictions, Humans, Dosage, Response(Biology), Mathematical models Experimental data, Laboratory animals, Biometry, Cancer, Neoplasms.

A problem of great concern currently faced by regulatory agencies is the prediction of carcinogenic risk of various environmental agents to man. Typically, a prediction of carcinogenic incidence in humans is required at a level of exposure considerably below experimental animal levels from which the predictions are derived. This presents two problems; first, the statistical extrapolation to low-dose levels, and secondly, the mouse-to-man or species extrapolation. The statistical techniques used for low-dose extrapolation is briefly discussed in this paper.

AD-A011 872/9GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Aerosol Particle Size as a Factor in Pulmonary Toxicity.
Final rept.,
R. F. Phalen, and O. G. Raabe. Dec 74, 15p Rept no. AMRL-TR-74-125-Paper-23
Prepared in cooperation with Lovelace Foundation for Medical Education and Research, Albuquerque, N. Mex.

Descriptors: *Respiratory system, *Aerosols, *Public health, *Toxicity, Fumes, Mist, Dust, Air pollution, Lung, Inhalation, Particle size, Retention(General), Deposition, Aerodynamics.
Identifiers: *Air pollution effects(Humans).

The particle size distribution of inhaled aerosols is a factor in pulmonary toxicity for several reasons. Among those discussed are the relationship between particle size and amount of toxic agent per particle, the influence of aerodynamic and real size on the regional deposition within various anatomical regions of the respiratory tract and the effect of both deposition site and particle size per se on clearance kinetics. The role of particle size in the assessment of environmental hazards is one that is increasingly being realized as important.

AD-A011 873/7GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Pulmonary Changes Induced by Ambient Levels of Ozone. A Morphological Study.
Final rept.,
L. W. Schwartz, W. S. Tyler, and D. L. Dungworth. Dec 74, 18p Rept no. AMRL-TR-74-125-Paper-24
Prepared in cooperation with California Univ., Davis.

Descriptors: *Ozone, *Respiratory system, *Lung, Air pollution, Exposure(Physiology), Histology, Pathology, Microscopy, Electron microscopy, Smog, Toxicology.
Identifiers: *Air pollution effects(Humans).

The objectives were to define the lesions of ambient levels of O3 (0.2, 0.5, and 0.8 ppm) after seven days of intermittent exposure using light microscopy, scanning electron microscopy (SEM), and transmission electron microscopy (TEM). SEM provided the advantages of observing large tissue samples and correlation of surface alterations with histologic and ultrastructural changes. This study was part of a larger one designed to correlate biochemical and morphological findings following O3 exposure and to compare the effects of continuous and intermittent daily exposure regimes. A portion of the biochemical results and the histochemical results have been published previously (Castleman et al., 1973a; Castleman et al., 1973b; Chow et al., 1974).

AD-A011 874/5GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
The Use of Cell Biology in Environmental Toxicology.
Final rept.,
Eugene D. Robin. Dec 74, 8p Rept no. AMRL-TR-74-125-Paper-25
Prepared in cooperation with Stanford Univ., Calif. School of Medicine.

Descriptors: *Toxicology, *Cytology, *Cells(Biology), Toxic agents, Physiology, Effectiveness, Pathology.
Identifiers: Cytopathology.

Studies of altered cellular structure and altered cellular function produced by toxic agents is an important and probably neglected component of toxicology. It is possible to develop a

rigorous and systematic approach for studying altered cell function produced by toxic agents. Aside from the practical advantages of such an approach, it offers the conceptual advantage of providing a unified interpretation of seemingly diverse phenomena as well as potentially leading to an understanding of molecular mechanisms of altered function. In turn, such understanding could lead to more rational approaches to prevention and treatment.

AD-A011 875/2GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Pulmonary Cellular Toxicity of Cadmium.
Final rept.,
J. A. Hayes, G. L. Snider, G. P. Lewis, and K. C. Palmer. Dec 74, 8p Rept no. AMRL-TR-74-125-Paper-26
Prepared in cooperation with Mallory Inst. of Pathology Foundation, Boston. Boston Univ., Mass. School of Medicine. Lemuel Shattuck Hospital, Boston, Mass., and Tufts Univ., Boston, Mass. School of Medicine.

Descriptors: *Lung, *Respiratory system, *Toxicity, *Cadmium, Inhalation, Cells(Biology), Pathology, Histology, Physiology, Biochemistry, Aerosols, Industrial medicine, Air pollution, Bioassay, Rats.
Identifiers: Histopathology, *Air pollution effects(Humans).

There are numerous instances of accidental industrial exposure to cadmium fume which have resulted in severe respiratory damage. Some of the survivors were later shown to have severe emphysema of the centrilobular type which suggested that animals given an appropriate exposure of cadmium by inhalation would provide a reproducible model of emphysema. Three groups of rats were exposed to the aerosol on 5, 10 and 15 occasions respectively and were killed at two hours, 3 days and 10 days after the last exposure. In summary, exposure of rats to cadmium aerosol, of an amount roughly equivalent to one pack of cigaretts in man, produces a marked wave of cell proliferation and a delayed wave of increased dehydrogenase activity. The mechanisms inducing these changes are presently unclear.

AD-A012 157/4GA PC$3.25/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Primary Irritation Evaluation of Candidate Insect Repellents Study.
Final rept. May-Jun 75,
Harvey Fisch. 9 Jul 75, 6p Rept nos. USAEHA-51-117-75, USAEHA-51-118-75
Also includes Rupt. no. USAEHA-51-120-75.

Descriptors: *Insect repellents, *Toxicity, *Irritant compounds, Eye, Skin(Anatomy), Bioassay, Rabbits, Laboratory animals, Humans.
Identifiers: Recommendations.

A13-36409, A13-36410 and A13-36421 (US Government Proprietary compounds) which are candidate insect repellents proposed for use by the Army, were evaluated on New Zealand White rabbits for their potential to cause skin and eye irritation. The data observed serve as a basis for making a recommendation concerning their potential use on humans. This recommendation is intended only for guidance in further entomological testing of these compounds.

N75-24319/6GA PC$5.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Toxic Substances Alert Program.
T. L. Junod. Apr 75, 118p NASA-TM-X-71711, E-8329

Descriptors: *Safety management, *Toxic hazards, Chemical effects, First aid, Industrial safety, Poisons, Toxicity, Toxicology.

For abstract, see STAR 1315

N75-24337/8GA PC$3.25/MF$2.25
Medical Biological Lab. RVO-TNO, Rijswijk (Netherlands).
An Alternative Therapy Against Organophosphate Poisoning.
O. L. Wolthuis. 1974, 23p MBL-1974-32, TDCK-65575

Descriptors: *Neuromuscular transmission, *Organic phosphorus compounds, *Respiratory impedance, *Therapy, *Toxic diseases, Cholinesterase, Imines, Paralysis.

For abstract, see STAR 1315

7. CHEMISTRY

7A. Chemical Engineering

AD-A011 806/7GA PC$3.75/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
The Coanda Effect Oil/Water Separator: A Development Study.
Technical note,
D. Pal. May 75, 45p Rept no. CEL-TN-1389
See also report dated Feb 74, AD-774 080.

Descriptors: *Oils, *Separators, *Water pollution, *Coanda effect, Water, Performance(Engineering), Fluid flow, Feasibility studies.
Identifiers: *Oil water separators, Oil pollution removal, Design, Oil wastes.

A new method of separating free oil from oil/water mixtures is under development at the Civil Engineering Laboratory. This technique uses the fluid-dynamic phenomenon, called the 'wall attachment, or Coanda effect'; such a separator would be considerably smaller than the conventional gross separators of the laminar flow types. This report describes in detail the development program of the separator from the original single-stage separator through the 20-gpm multi-stage separator.

AD-A011 945/3GA PC$4.75/MF$2.25
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
Development and Application of Ion Exchange Silver Recovery System.
Final rept. Sep 72-Mar 73,
Archie G. Buyers, Edward R. Moss, and Gary R. Kramer. May 74, 84p AFWL-TR-73-193
Contract F29601-72-C-0024

Descriptors: *Ion exchange, *Silver, *Photographic fixers, Fouling, Wastes(Industrial), Costs, Sulfur, Sulfides, Colloids, Antifouling, Ion exchange resins, Chemical equilibrium.
Identifiers: *Materials recovery, *Industrial waste treatment.

A study was conducted on the feasibility and extent of application of the ion exchange process as a method for silver recovery from spent photographic fixer solutions. The study demonstrates the technical feasibility of using ion exchange systems to recover silver from photographic fixer solutions for silver concentrations between 0.05 and 0.5 gm/l. However, ion exchange system operation at or above silver concentrations of 0.5 gm/l appears to negate any cost advantages over the electrolytic recovery systems. In addition, operation at concentrations under 0.05 gm/l requires about 10 times the resin needed at concentrations of 1.0 mg/l. A previously postulated resin-fouling mechanism was supported by experimental exchange data from a series of synthetic spent fixer solutions. Fouling during silver stripping may be caused by the formation of colloidal sulfur and silver sulfide particles with electrostatic charges neutralized by anionic exchange sites of the resin. A re-examination proved that an aqueous sodium acetate prewash of an anionic exchange column is a satisfactory method of preventing resin fouling by inorganic colloids.

AD-A012 171/5GA PC$3.25/MF$2.25
Army Armament Command Rock Island Ill Systems Analysis Office
Establishment of Buffer Zones for Bulk Storage of Common Chemical Compounds.
Technical note,
Thomas N. Mazza, and Norman H. Trier. May 75, 22p Rept no. SAO-Note-23

Descriptors: *Acids, *Hazards, Buffers, Storage, Ammonia, Acetic acid, Sulfuric acid, Nitric acid, Acetic anhydride, Toxicity, Spills.
Identifiers: *Bulk storage, Buffer zones, Hazardous materials spills.

The Department of the Army and the General Services Administration have recommended that certain parcels of land located adjacent to the new acid area at Volunteer AAP be declared excess. Attempts were made to provide rationale for retention of this area based on the need for a safety buffer zone. This rationale was not accepted by DA since there is no formal policy in regard to buffer zones around areas containing bulk storage of common chemical compounds. This report describes the rationale and methodology used to establish hazard distances from which buffer zone policy can be established.

NTIS/PS-75/574/4GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Waste Treatment by Reverse Osmosis and Membrane Processes (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner. Jul 75, 122p*
Supersedes NTIS/PS-75/017.

Descriptors: *Industrial waste treatment, *Bibliographies, *Sewage treatment, *Electrodialysis, Performance, Design, Membranes, Osmosis, Dialysis, Abstracts.
Identifiers: *Reverse osmosis, Ultrafiltration, *Water pollution control.

The research covers the treatment of sewage and industrial wastes by reverse osmosis, ultrafiltration, electrodialysis and other osmotic processes. Desalting of ground, surface, and sea waters is not included. (Contains 117 abstracts)

N75-24113/3GA PC$3.25/MF$2.25
Institute of Gas Technology, Chicago, Ill.
Hydrogen Production from Coal.
Interim Report.
24 Apr 75, 16p NASA-CR-142816
Contract NAS1-13620
Conf-Presented at NASA Symp., Huntsville, Ala., 24 Apr. 1975.

Descriptors: *Coal gasification, *Hydrogen, Bitumens, Boilers, Chemical composition, Chemical reactions, Fluidized bed processors, Hydrogen fuels.

For abstract, see STAR 1315

N75-24167/9GA PC$4.25/MF$2.25
Chemical Lab. RVO-TNO, Rijswikj (Netherlands).

The Dynamics of Adsorption of Vapours by Porous Adsorbents in Fixed Beds. (Breakthrough Curves of Sarin on Charcoal in the Very Low Concentration Region).
R. H. Vandongen, and P. C. Stamperius. Aug 74, 53p TDCK-65300, CL-1974-4

Descriptors: *Adsorption, *Beds (Process engineering), *Charcoal, *Gases, Elution, Mathematical models, Moisture content, Porosity, Statistical analysis, Transfer functions.

For abstract, see STAR 1315

N75-24168/7GA PC$3.75/MF$2.25
Chemical Lab. RVO-TNO, Rijswikj (Netherlands).
Non-Destructive Test of Charcoal Filters. Part 3: Characteristics of the Elution Peaks of Ethane and Propane on Partially Spent Charcoal Filters of Various Moisture Contents.
R. H. Vandongen. 1974, 29p TDCK-65348, CL-1974-5

Descriptors: *Adsorption, *Air purification, *Beds (Process engineering), *Charcoal, *Filtration, Elution, Ethane, Gases, Moisture content, Nondestructive tests, Propane.

For abstract, see STAR 1315

PB-242 517/1GA PC$4.75/MF$2.25
National Environmental Research Center, Cincinnati, Ohio. Water Supply Research Lab.
Laboratory Verification Test Agreement No. CJ-002.
Final rept.,
J. Keith Carswell. Jul 74, 83p NSF/RA/R-74-034
Prepared in cooperation with Alron Industries, Inc., Rochester, N.Y.

Descriptors: *Water treatment devices, *Ozonization, Tests, Performance evaluation, Chemical removal(Water treatment), Bacteria, Viruses, Organic compounds, Trace elements, Sterilization.

This final report provides a descriptive summary, including detailed technical data, of a project under which an innovative water purification system developed by Alron Industries of Rochester, New York, was tested for effectiveness in removing a variety of inorganic and organic contaminants. This project was funded by NSF in order to obtain verification of selected product performance parameters by an independent, scientifically recognized organization, as a means of influencing the future commercial development and marketing potential of the tested system. The system employs ozone treatment to remove bacteria, viruses, and chemical.

PB-242 521/3GA PC$4.25/MF$2.25
General Electric Co., Lynn, Mass. Direct Energy Conversion Programs.
Research on Reverse Osmosis Membranes for Purification of Wash Water at Sterilization Temperature (165 Degrees F).
Research rept. no. 2, Mar 71-Sep 74,
M. E. Nolan, and A. B. LaConti. Jun 75, 58p
W75-08575, Int-OSW-RDPR-75-1003
Contract DI-14-30-2752

Descriptors: *Membranes, *Water treatment, Performance evaluation, Fabrication, Sterilization, Waste water.
Identifiers: Polysulfones, *Tubular membranes, Wash water, *Reverse osmosis.

The goal was to develop viable reverse osmosis (RO) modules and systems of tubular design of approximately 80 gpd capacity to recover wash water at sterilization temperatures. An 80 gpd RO system was fabricated for recovering wash water at sterilization temperatures. The performance characteristics of ancillary components including particulate filters, gauges, meters, RO pump, accumulator carbon polishing column were verified by integrating the components into a suitable subsystem containing the RO module and life testing with wash water. The twenty tube module was used to define the total system and identify/correct some of the life limiting problems, and was tested under simulated mission conditions with wash water. It appears a viable 80 gpd sulfonated PPO RO system for recycling wash water at sterilization temperatures and meeting the National Academy of Science (NAS) specifications is feasible.

PB-242 535/3GA PC$8.50/MF$2.25
Battelle Columbus Labs., Ohio.
Fuels Technology: A State-of-the-Art Review.
Environmental protection technology series (Final),
E. H. Hall, D. B. Peterson, J. F. Foster, K. D. Kiang, and V. W. Ellzey. Apr 75, 260p*
EPA/650/2-75-034
Contract EPA-68-02-1323

Descriptors: *Coal gasification, *Coal liquefaction, *Coal preparation, *Air pollution control, Chemical cleaning, Flotation, Grinding, Crushing, Washing, Fuel oil, Desulfurization, Low btu gas, High btu gas, Fluidized bed processing, Fluidized bed combustion, In situ processing, Flue gases, Pilot plants, Flow charting, Equipment, Design, Entrainment, Refining, Reviews.

The report gives results of a state-of-the-art review of various fuel-cleaning, fuel-conversion, and emission control technologies. It includes the following classes of technologies: physical and chemical coal cleaning, residual oil desulfurization, coal refining (liquefaction), coal and oil gasification, fluidized-bed combustion of coal, and stack gas cleaning. For each technology, the report presents the extent of current practice and the status of systems under development.

PB-242 541/1GA PC$11.25/MF$2.25
Tennessee Valley Authority, Muscle Shoals, Ala.
Detailed Cost Estimates for Advanced Effluent Desulfurization Processes.
Environmental protection technology series,
G. G. McGlamery, R. L. Torstrick, W. J. Broadfoot, J. P. Simpson, and L. J. Henson. Jan 75, 429p* TVA-Bull-Y-90 EPA/600/2-75-006

Descriptors: *Flue gases, *Sulfur dioxide, *Desulfurization, Regeneration(Engineering), Cost estimates, Operating costs, Capitalized costs, Scrubbers, Electric power plants, Reduction(Chemistry), Waste gas recovery, Economic analysis, Design, Air pollution control equipment, Boilers, Performance, Process charting.
Identifiers: *Air pollution control, *Cat-Ox process, *Limestone scrubbing, *Magnesium oxide scrubbing, *Wellman process.

A detailed, segmented, highly visible cost comparison of the five leading stack gas desulfurization processes was conducted. Using data available in late 1973, complete economic evaluations were prepared for limestone slurry scrubbing, lime slurry scrubbing, magnesia slurry scrubbing - regeneration to sulfuric acid, sodium solution scrubbing - SO2 reduction to sulfur, and catalytic oxidation (Cat-Ox). Assuming the process technology to be proven in application, a prescribed set of representative power plant, process design, and economic premises was established. For each process design, projections are included for a base case (500-MW, 3.5% S in coal, new unit) and 16 other variations in power unit size, fuel type (coal or oil), sulfur in fuel, unit status (new vs. existing), solids disposal method (off-site vs. on-site ponding), and SO2 removal (80% vs. 90%). Capital investment, annual operating costs (7,000 hr/yr) and lifetime operating costs (over a 30-year declining operating profile) were estimated for the base case and each variation. Using sensitivity analysis, effects of variations in energy costs, raw material costs, maintenance costs, cost of capital, operating labor cost escalation, and net sales revenue were studied. A 3-year construction schedule ending in mid-1975 is assumed for a midwestern location. Investment costs (mid-1974 dollars) can be scaled or altered to reflect any predictable project schedule, escalation rate, or location. Definition of the systems estimated, sources of cost data, and recommended equipment size-cost scale factors are given.

PB-242 543/7GA PC$6.25/MF$2.25
Battelle Columbus Labs., Ohio.
Development of Information for Standards of Performance for the Fossil Fuel Conversion Industry.
Final rept.,
B. Kim, J. M. Genco, J. Oxley, and P. Choi. Oct 74, 157p EPA/450/3-75-029
Contract EPA-68-02-0611

Descriptors: *Coal gasification, *Desulfurization, Manufactured gas, Synthesis gas, Low btu gas, High btu gas, Materials recovery, Sulfur, Sulfur dioxide, Air pollution control, Reviews.
Identifiers: Lurgi process, Synthane process, Hygas process, Carbon dioxide acceptor process, Koppers-Totzek process, Selexol process, Rectisol process, Purisol process, Fluor solvent process, Adip process, Alkazid process, Claus process, Stretford process, Giammarco Vetrocoke process, Beavon process, Cleanair process, IFP process, Scot process, Sulfreen process, W-L sulfur dioxide recovery process.

This report recapitulates information developed in EPA Report No. 9075-015 pertaining to four SNG coal gasification processes (Lurgi, Synthane, Hygas and CO2-Acceptor) and one Low-BTU fuel gasification process (Lurgi). Commercial literature on another Low-BTU process (Koppers-Totzek) is also recapitulated. Control of sulfurous emissions is discussed. (Bibliography included).

7B. Inorganic Chemistry

AD-A011 899/2GA PC$3.25/MF$2.25
Wisconsin Univ Milwaukee Dept of Physics
Ultrasonic Identification of a New Spin-Ordering Phase Transition Holmium,
M. Tachiki, R. A. Treder, M. C. Lee, and M. Levy. 11 Jun 74, 7p AFOSR-TR-75-0763
Grant AF-AFOSR-2079-71
Summary in French.
Availability: Pub. in Solid State Communications, v15 p1071-1074 1974.

Descriptors: *Holmium, *Phase studies, *Transitions, Single crystals, Ultrasonic radiation, Neutron diffraction, Curie temperature, Neel temperature, Anisotropy, Transverse waves, Reprints.
Identifiers: Spiral phase, Spin ordering.

A new tilted spiral phase has been identified in two single crystals of holmium. Holmium goes from the spin spiral state to this tilted phase at about 24 K and to a conical phase at about 20 K. Previous measurements by different techniques have missed the phase transition at 24 K. However the ultrasonic attenuation coefficient of shear waves propagating along the c-axis shows a peak at 24 K in addition to the expected peak at 20 K. As is expected from the theoretical model presented, longitudinal waves do not show a maximum at 24 K while they do have one at 20 K. This new phase transition is expected to occur because the spin wave dispersion curve has a minimum which approaches zero at the transition temperature. Due to the symmetry of transverse waves it is possible to have one magnon one phonon resonant absorption at the minimum of the dispersion

curve. However longitudinal waves are absorbed through a one phonon two magnon process and this does not produce resonant absorption. As is expected the peak in attenuation moves up in temperature when an applied magnetic field is perpendicular to the C-axis and down in temperature when it is parallel to the C-axis. (Author)

AD-A012 032/9GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Physics
High-Pressure Synthesis of Beta-W Type Nb3Te,
J. F. Cannon, D. L. Robertson, H. Tracy Hall, and A. C. Lawson. 14 Jan 74, 3p AFOSR-TR-75-0902
Contract F44620-72-C-0017
Availability: Pub. in Jnl. Physics and Chemistry of Solids, v35 p1181-1182 1974.

Descriptors: *Niobium compounds, *Tellurides, *Superconductivity, *Superconductors, *Synthesis(Chemistry), High pressure, Chalcogens, Phase studies, Crystal structure, Reprints.

High pressure, high temperature techniques were used to synthesize beta W type Nb3Te with a lattice parameter a = 5.261A. This compound represents that first reported beta W type chalcogenide. The superconducting transition is no higher than 2.5 degrees K. (Author)

AD-A012 153/3GA MF$2.25
Army Tank-Automotive Command Warren Mich
Use of Atomic Absorption Spectrometry in the Determination of Copper in Specification CCC-C-428 Materials.
Technical rept.,
Cosby Bramlett. Apr 75, 16p Rept no. TACOM-TR-12035
Availability: Available in microfiche only.

Descriptors: *Copper, *Chemical analysis, *Fungicides, Atomic spectroscopy.
Identifiers: *Atomic absorption spectroscopy, Spectroscopic analysis.

This is a report of the development of an atomic absorption technique for the determination of the total copper in fungicides. The method was successfully applied to different types of materials containing copper and conforming to specification requirements. The analytical method is detailed in the Appendix.

AD-A012 322/4GA PC$3.25/MF$2.25
Oregon Univ Eugene Dept of Physics
K-Shell Fluorescence Yield of Multiply Ionized Ne,
Mau Hsiung Chen, Bernd Crasemann, and Dennis L. Matthews. 24 Mar 75, 5p ARO-10121.18-P
Grants DAHC04-74-G-0065, NGR-38-003-036
Availability: Pub. in Physical Review Letters, v34 n21 p1309-1312, 26 May 75.

Descriptors: *Fluorescence, *Ionized gases, Neon, Energy levels, Ions, Atoms, Particle collisions, Electron transitions, X rays, Reprints.
Identifiers: Multiply ionized gases, K shell vacancies.

AD-A012 324/0GA PC$3.25/MF$2.25
Kansas State Univ Manhattan Dept of Physics
Average Fluorescence Yields for Multiply-Ionized Neon,
C. P. Bhalla. 21 Jan 75, 4p ARO-9827.24-P
Grant DAHC04-74-G-0137
Availability: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v8 n8 p1200-1202 1975.

Descriptors: *Fluorescence, *Ionized gases, Neon, Ions, Energy levels, Particle collisions, Electron transitions, Reprints.
Identifiers: Multiply ionized gases, Quantum numbers, K shell vacancies.

Theoretical K-shell fluorescence yields for various electronic configurations of neon are presented. These fluorescence yields are averages of the level fluorescence yields with a statistical population. (Author)

PB-242 826/6GA PC$3.75/MF$2.25
Environmental Protection Agency, Washington, D.C. Office of Toxic Substances.
Draft Economic Impact Assessment for the Proposed Toxic Substances Control Act (S.776).
Jun 75, 35p* EPA/560/4-75-002

Descriptors: *Chemical compounds, *Toxicity, *Legislation, *Economic impacts, *Hazardous materials, Control, Evaluation, Cost estimating, Federal policies, Chemical industry, National government, Prediction, Regulations, Tests.
Identifiers: *Toxic substances.

A draft report estimates the direct costs to industry associated with the implementation of the principal provisions of the proposed Toxic Substances Control Act (S.776). The annual direct costs are estimated to be between $78.5 and 141.5 million. About two-thirds of these costs are shown to be attributable to the areas of premarket screening and regulatory actions, with about one-third attributable to the requirements concerning industrial testing and reporting.

7C. Organic Chemistry

AD-A011 780/4GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
MINDO/3 Study of Some Diels-Alder Reactions,
Michael J. S. Dewar, Anselm C. Griffin, and Steven Kirschner. 20 Jun 74, 3p AFOSR-TR-75-0788
Contract F44620-71-C-0119
Availability: Pub. in Jnl. of the American Chemical Society, v96 n19 p6225-6226, 18 Sep 74.

Descriptors: *Ethylene, *Butadienes, *Acetylene, *Cyclobutenes, *Addition reactions, Molecular orbitals, Reprints.
Identifiers: MINDO/3, Diels-Alda reaction.

MINDO/3 calculations are reported for the Diels-Alder reactions of ethylene with 1,3-butadiene and cyclobutadiene, and acetylene with cyclobutadiene. The calculated transitions are very unsymmetrical 'biradicaloids' which seem to support the 'two stage' concerted mechanism. (Author)

AD-A011 783/8GA PC$3.25/MF$2.25
Georgia Univ Athens Dept of Chemistry
Metal Polypyrazolylborate Complexes. I. Reactions of Perfluoroalkylmetal Carbonyl Halides of Iron and Cobalt with Polypyrazolylborates,
R. B. King, and A. Bond. 24 Sep 73, 6p AFOSR-TR-75-0835
Grant AF-AFOSR-2000-71
See also AD-A011 784.
Availability: Pub. in Jnl. of the American Chemical Society, v96 n5, 6 Mar 74.

Descriptors: *Complex compounds, *Pyrazoles, *Borates, *Metalorganic compounds, *Chemical reactions, *Iron compounds, *Cobalt compounds, Carbonyl compounds, Synthesis(Chemistry), Fluorine compounds, Reprints.

AD-A011 784/6GA PC$3.25/MF$2.25
Georgia Univ Athens Dept of Chemistry
Metal Polypyrazolylborate Complexes. II. Reactions of Trimethylplatinum Derivatives with Polypyrazolylborates,
R. B. King, and A. Bond. 24 Sep 73, 8p AFOSR-TR-75-0836
Grant AF-AFOSR-2000-71
See also AD-A011 785.
Availability: Pub. in Jnl. of the American Chemical Society, v96 n5 p1338-1343, 6 Mar 74.

Descriptors: *Complex compounds, *Pyrazoles, *Metalorganic compounds, *Platinum compounds, *Borates, *Chemical reactions, Carbonyl compounds, Synthesis(Chemistry), Iodides, Reprints.

AD-A011 785/3GA PC$3.25/MF$2.25
Georgia Univ Athens Dept of Chemistry
Metal Polypyrazolylborate Complexes. III. Reactions of Allyliron Tricarbonyl Iodine with Polypyrazolylborates,
R. B. King, and A. Bond. 24 Sep 73, 9p AFOSR-TR-75-0837
Grant AF-AFOSR-2000-71
See also AD-A011 784.
Availability: Pub. in Jnl. of the American Chemical Society, v96 n5 p1343-1348, 6 Mar 74.

Descriptors: *Complex compounds, *Pyrazoles, *Borates, *Metalorganic compounds, *Iron compounds, *Chemical reactions, Carbonyl compounds, Synthesis(Chemistry), Iodides, Reprints.

AD-A011 787/9GA PC$3.25/MF$2.25
Sussex Univ Brighton (England) Dept of Chemistry
Bonding Studies of Compounds of Boron and the Group III and IV Elements. XII. Variable Temperature He I Photoelectron Spectra of Group III Halides, 2MX3 -- M2X6 (M = Al or Ga, X = Cl, Br, or I),
M. F. Lappert, J. B. Pedley, G. J. Sharp, and N. P. C. Westwood. 30 Jan 74, 4p AFOSR-TR-75-0925
Grant AF-AFOSR-2220-72
See also AD-766 192.
Availability: Pub. in Jnl. of Electron Spectroscopy and Related Phenomena, v3 p237-239 1974.

Descriptors: *Chemical bonds, *Boron compounds, *Halides, *Aluminum compounds, *Gallium compounds, Temperature, Photoelectrons, Spectra, Chlorides, Bromides, Iodides, Molecular orbitals, Metalorganic compounds, Reprints.

Variable temperature He(I) photoelectron spectra (PES) of some of the heavier Group III metal halides have been recorded: 2MX3 yields reversibly M2X6 (M = Al or Ga; X = Cl, Br or I). The dimer is favored by the lightest M and X. The PES of the monomer MX3 species show close parallels with those of BX3 implying that structures are probably very similar. Complete assignments of molecular orbitals (MO's) for the dimers M2X6 will require a more extensive series to be examined and ab initio MO calculations to be performed. (Author)

AD-A011 968/5GA PC$3.25/MF$2.25
Wisconsin Univ Madison
Infinite-Dilution Viscoelastic Properties of Poly(n-hexyl isocyanate),
Norio Nemoto, John L. Schrag, and John D. Ferry. 7 Jun 74, 10p ARO-9479.20-C
Grant DA-ARO-D-31-124-73-G48
Availability: Pub. in Polymer Jnl, v7 n2 p195-201 1975.

Descriptors: *ISocyanates, *Hexanes, *Polymers, *Viscoelasticity, Dilution, Solutions(Mixtures), Reprints.

AD-A011 969/3GA PC$3.25/MF$2.25
Wayne State Univ Detroit Mich Dept of Chemistry
1-Phospha-2,8,9-Trioxaadamantane Oxonide. A Convenient Source of Singlet Molecular Oxygen,
A. Paul Schaap, Kenneth Kees, and Arthur L. Thayer. 21 Jan 75, 4p ARO-11030.9-C
Grant DA-ARO-D-31-124-73-G17

Availability: Pub. in Jnl. of Organic Chemistry, v40 n8 p1185-1186 1975.

Descriptors: *Ozonides, *Phosphites, *Oxygen, Pyrolysis, Decomposition, Molecules, Reprints.

Thermal decomposition of 1-phospha-2,8,9-trioxaadamantane ozonide produces singlet molecular oxygen in quantitative yield (K sub 1=.00101/sec at 18 degrees in CH2Cl2). (Author)

AD-A011 977/6GA PC$3.25/MF$2.25
North Carolina Univ Chapel Hill Dept of Chemistry
Oxidation State Properties of Delocalized, Ligand-Bridged Metal Complexes. (Ru3O(CH3CO2)6L3)n+EF and the Pyrazine-Bridged, Cluster-Cluster Dimer, βRu3OβCH3CO2γ6βpyγ2γ2pyzm+,
Stephen T. Wilson, Richard F. Bondurant, Thomas J. Meyer, and Dennis J. Salmon. 3 Feb 75, 4p ARO-11167.8-C
Grant DA-ARO-D-31-124-73-G104
Availability: Pub. in Jnl. of the American Chemical Society, v97 n8 p2285-2287, 16 Apr 75.

Descriptors: *Complex compounds, *Metalorganic compounds, *Ligands, *Ruthenium compounds, Nitrogen heterocyclic compounds, Oxidation, Oxidation reduction reactions, Polymers, Two dimensional, Reprints.

This paper presents the results of an investigation of the redox properties and some aspects of the synthetic chemistry of the triangular ruthenium cluster systems. (Author)

AD-A012 169/9GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Absorption of DF Laser Radiation by Propane and Butane.
Research and development technical rept., Kenneth O. White, and Wendell R. Watkins. Jun 75, 20p Rept no. ECOM-5563

Descriptors: *Propane, *Butanes, *Absorption spectra, *Infrared spectra, Vapors, Laser beams, Coefficients, Absorption(Physical), Gas lasers.
Identifiers: Deuterium fluoride lasers, Laser spectroscopy.

Strong absorption bands exist in propane, n-butane, and isobutane in the 3.8 micrometer DF (deuterium flouride) laser spectral output region. Spectral scans of pure atmospheres of these gases were made using a spectrophotometer to obtain moderate resolution data. Long-path absorption cell measurements were made using five DF laser output wavelengths to obtain high resolution data for the three gases. The absorption cell concentrations of the gases used, 150 to 450 mtorr, were buffered to 760 torr with nitrogen. Results show that DF radiation is attenuated by a few percent per km when propane or butane concentrations are a few ppm.

AD-A012 264/8GA PC$3.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Compounds of the alpha-Prodine Type. V. Preparation of 1-Substituted Homologs and Analogs of 1-Benzoylethyl-4-Phenyl-4-Piperidinol and Their Esters. Reduction of Keto Esters to the Corresponding Hydroxy Esters.
Technical rept. Jan 63-Jun 70,
William R. Hydro. Mar 75, 24p Rept no. EC-TR-74099
See also Part 6 dated Mar 75, AD-A009 129.

Descriptors: *Piperidines, *Ketones, *Esters, Alcohols, Chemical structure, Synthesis(Chemistry), Chemical reactions, Catalysts.
Identifiers: Propionphenone/phenylpiperidino.

The preparation and use of a number of Mannich bases and the corresponding methiodides for the synthesis of 1-substituted-4-phenyl-4-piperidinols and their ester hydrochlorides is described. Substituents in the 1-position included phenyl substituted benzoylethyl, 2-benzoylpropyl, 2-furoylethyl, 2-thenoylethyl, 2-(2-dibenzothenoyl), and 3-(2-thienyl)-2-propenyl groups. Monoesters were prepared by acylating the desired piperidinol with acyl halides of 2 to 4 carbon atoms; diesters were prepared by acylating 2 moles of the desired piperidinol with 1 mole of diacyl halide of up to 6 carbon atoms. An unusual diester was prepared by acylation of 1,4-bis(3-(4-pehnyl-4-hydroxy-1-piperidino)propionyl)benzene with 2 moles of a monoacyl halide. A successful, reliable method was developed for the catalytic reduction of keto ester hydrochlorides to the corresponding hydroxy ester hydrochlorides.

AD-A012 321/6GA PC$3.25/MF$2.25
Pittsburgh Univ Pa Dept of Chemistry
Electronic Structure of N,N-Dimethylnitramine and N,N-Dimethylnitrosamine from X-ray and UV Electron Spectroscopy,
Michael G. White, Richard J. Colton, Ting Ho Lee, and J. Wayne Rabalais. 15 Dec 74, 9p ARO-11601.9-C
Grants DAHC04-74-G-0039, NSF-GP-37724
Availability: Pub. in Chemical Physics, 8 P391-398 1975.

Descriptors: *Nitrosamines, *Nitramines, *Electron spectroscopy, X ray spectroscopy, Ultraviolet spectroscopy, Band spectra, Oxidation, Nitrogen, Reprints.

N75-24446/7GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Organic Analysis by Nuclear Magnetic Resonance.
C. Trogolo. Apr 75, 14p NASA-TT-F-16276
Contract NASW-2481
Tran-Transl. Into English from Rev. Combust. (Italy), V. 25, 1971 p 502-508.

Descriptors: *Nuclear magnetic resonance, *Organic compounds, Absorption spectra, Crude oil, Organic chemistry, Spectroscopic analysis, Spin-spin coupling.

For abstract, see STAR 1315

PAT-APPL-499 810/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Phosphorus, Nitrogen, Bromine Containing Polymers and Process for Producing Flame Retardant Textiles.
Patent Application,
Darrell J. Donaldson, George L. Drake, Jr., and John V. Beninate. Filed 22 Aug 74, 24p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Fire resistant textiles, *Phosphines, *Bromine organic compounds, Synthesis(Chemistry), Fire resistant materials, Nitrogen organic compounds, Carbinols.
Identifiers: Methanol/phosphoranylylidene-tri.

The patent application concerns textile treating compositions containing the elements phosphorus, nitrogen, and bromine and the processes for imparting flame resistance to organic fibrous materials. This is accomplished by impregnating the textile treating compositions consisting of (1) tris(hydroxymethyl)phosphine mixed with nitrogenous compounds containing at least two members of the group hydrogen and methylol radicals (-CH2OH) attached to trivalent nitrogen atoms, or (2) soluble methylol phosphine adducts which contain one or more methylol phosphine radicals (P-CH2OH) prepared by reacting tris(hydroxymethyl)phosphine with an amide or amine which contains one or more hydrogens attached to a trivalent nitrogen with an organic bromine containing material with at least 10% bromine in the form of bromine atoms attached to carbon atoms, in proportions selected so that generally the phosphorus contained in structures of the group (-CH2)3P amounts to a small portion of the total weight of the mixture, and heating to cause insolubilization in or on the fibrous structure.

PAT-APPL-529 975/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Quaternary Arylaminoalkyl Phosphonium Salts and Process for the Preparation Thereof.
Patent Application,
Arlen W. Frank, and George L. Drake, Jr. Filed 5 Dec 74, 14p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, Plasticizers, Lubricant additives, Synthesis(Chemistry), Arylamines, Organic salts, Phosphorus organic compounds, Surfactants, Fire resistant textiles.
Identifiers: *Phosphonium compounds, Phosphonium chloride/tetrakis((phenylamine)methyl).

The patent application relates to quaternary phosphonium salts which contain four arylaminoalkyl substituents attached to each phosphorus atom. Novel quaternary arylaminoalkyl phosphonium salts having the formula ((ArNHCHR)(P)(+)(-)), where R is a radical selected from the group consisting of hydrogen, alkyl and aryl, Ar is aryl, and X is halogen, are prepared by the reaction of primary aromatic amines with quaternary hydroxyalkyl phosphonium salts having the formula ((HOCHR)4P)(+)X(-), where R and X are similarly defined. The compounds of this invention are useful as flame retardant for cotton, plasticizers, lubricant additives, and surface-active agents.

PATENT-3 354 214 Not available NTIS
Department of the Air Force Washington D C
5-Lower-Alkyl-10-Phenyl-5,10-Dihydrophenophosphazine Compounds.
Patent,
Christ Tamborski. Filed 15 Sep 64, patented 21 Nov 67, 2p Rept nos. PAT-APPL-396 779,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Lubricant additives, *Patents, Phosphine, Synthesis(Chemistry), Heterocyclic compounds, High temperature, Nitrogen heterocyclic compounds, Polycyclic compounds, Organic phosphorus compounds.
Identifiers: High temperature lubricants, PAT-CL-260-576, Phenophosphazine/dihydro-ethylphenyl, Azaphosphorines.

This invention relates to a new class of nitrogen-phosphorus heterocycles characterized by improved high-temperature anti-oxidant and wear resistant properties rendering them particularly adaptable for use as additives to lubricating oils, greases and hydraulic fluids. 5-Lower-alkyl-10-phenyl-5,10-dihydrophenophosphazine compounds are made by metalating a N-alkyl-2,2'-dihalodiphenylamine with magnesium or lithium and subsequently reacting the diorganometallic compound with phenyl- or alkyldihalophosphine.

PATENT-3 385 901 Not available NTIS
Department of the Air Force Washington D C

Fluorinated Carbinols and Method of Preparing Same.
Patent,
Christ Tamborski, and Laurence W. Breed.
Filed 6 Apr 65, patented 28 May 68, 3p Rept nos. PAT-APPL-446 098,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Carbinols, *Fluorinated hydrocarbons, Synthesis(Chemistry), Benzene, Heat resistant plastics.
Identifiers: PAT-CL-260-618.

This invention relates to fluorinated carbinols and procedures for preparing carbinols having a number of fluorine atoms thereon. The carbinols thus produced are useful as intermediates for various organic reactions and particularly for use in production of oxidatively stable and heat resistant synthetic polymers which may be formed in accordance with conventional condensation reactions. The compounds have the general formula YRC(CF3)2OH wherein R is -(C6F4)x- with x=1,2,3 and Y is an atom or radical selected from the group consisting of H,F,Cl,I,Br,--CF3 and -C(CF3)2-.

PATENT-3 392 178 Not available NTIS
Department of the Air Force Washington D C
Pentafluorophenylorganometallic Compounds of Germanium and Tin.
Patent,
Christ Tamborski. Filed 31 Mar 64, patented 9 Jul 68, 2p Rept nos. PAT-APPL-356 324,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Organometallic compounds, *Patents, *Germanium compounds, *Tin compounds, Synthesis(Chemistry), Fluorinated hydrocarbons.
Identifiers: PAT-CL-260-429.

The patent describes the preparation of pentafluorophenylorganometallic compounds of germanium and tin through the reaction between a pentafluorophenyl Grignard reagent and a substituted or unsubstituted germanium or tin chloride to yield products as (C6F5)nM(C6H5)(4-n), where M is either germanium or tin and n is 1, 2, 3 or 4.

PATENT-3 459 794 Not available NTIS
Department of the Air Force Washington D C
4-Thiol-2,3,5,6-Tetrafluorobenzoic Acid.
Patent,
Christ Tamborski. Filed 11 Jan 66, patented 5 Aug 69, 2p Rept nos. PAT-APPL-520 317,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Lubricant additives, *Fluorinated hydrocarbons, *Benzoic acids, *Patents, Synthesis(Chemistry), Thiols.
Identifiers: PAT-CL-260-516, Benzoic acid/mercapto-tetrafluoro.

This invention relates to novel di-functional tetrafluoro aromatic compounds and to the method for the synthesis thereof. Polymerizable compounds useful as lube additives having the formula (C6F4)(COOH)X where X is a functional group selected from methyl, trifluoromethyl, carboxy, hydroxy, amino, thiol and 2,3,5,6-tetrafluorophenyl are synthesized.

PATENT-3 787 456 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Benzyl-N-2-Acetoxyethyl-Oleamide.
Patent,
Robert R. Mod, Frank C. Magne, and Evald L. Skau. Filed 13 Sep 72, patented 22 Jan 74, 10p PAT-APPL-288 840,
Errata sheet dated 22 Jan 74 included. Supersedes PB-229 912.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Plasticizers, *Amides, Performance, Vinyl chloride resins, Synthesis(Chemistry).
Identifiers: PAT-CL-260-404, *Oleamides, Oleamide/N-acetoxyethyl-N-benzyl.

The invention provides N-benzyl-N-2-acetoxyethyloleamide, which is useful as a plasticizer for vinyl chloride resins.

PATENT-3 787 457 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Ethyl-N-3-Ethoxypropyl-Oleamides.
Patent,
Robert R. Mod, Frank C. Magne, and Evald L. Skau. Filed 13 Sep 72, patented 22 Jan 74, 11p PAT-APPL-288 802,
Errata sheet dated 22 Jan 74 included. Supersedes PB-230 646.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Plasticizers, *Amides, Vinyl chloride resins, Synthesis(Chemistry), Aliphatic compounds.
Identifiers: PAT-CL-260-404, *Oleamides, Oleamide/N-ethoxypropyl-N-ethyl.

The invention provides an N-alkyl-N-3-ethoxypropyloleamide, wherein the alkyl group contains 1-4 carbon atoms, which is useful as a plasticizer for vinyl chloride resins.

PATENT-3 803 186 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Cyclohexyl-N-2-Acetoxyethyl-Oleamide.
Patent,
Robert R. Mod, Frank C. Magne, and Evald L. Skau. Filed 13 Sep 72, patented 9 Apr 74, PAT-APPL-288 812,
Supersedes PB-230 318.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Plasticizers, *Patents, *Amides, Aliphatic compounds, Vinyl chloride resins, Synthesis(Chemistry).
Identifiers: PAT-CL-260-404, *Oleamides, Oleamide/N-acetoxyethyl-N-cyclohexyl.

The invention provides N-cyclohexyl-N-2-acetoxyethyloleamide, which is useful as a plasticizer for vinyl chloride resins.

PATENT-3 808 241 Not available NTIS
Department of Agriculture, Washington, D.C.
N,N-Bis(2-(3-Carboalkoxypropionyloxy)Ethyl)-Oleamides.
Patent,
Robert R. Mod, Frank C. Magne, and Evald L. Skau. Filed 7 May 71, patented 30 Apr 74, 8p PAT-APPL-288 813,
Superseded PB-229 910. Previously filed as PAT-APPL-288 813, 13 Sep 72.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Amides, *Plasticizers, Aliphatic compounds, Synthesis(Chemistry), Vinyl chloride resins, Alkoxy compounds.
Identifiers: PAT-CL-260-404, Oleamides.

This invention provides N,N-bis(2-(3-carbobutoxypropionyloxy)ethyl) - oleamide and N,N-bis(2-(3-carbohexanoxypropinoyloxy)ethyl)oleamide, which are plasticizers for vinyl chloride resins.

PATENT-3 808 242 Not available NTIS
Department of Agriculture, Washington, D.C.
N,N-Di-N-Butyl-2-(Oleoyloxy) Propionamide.
Patent,
Robert R. Mod, Frank C. Magne, and Evald L. Skau. Filed 13 Sep 72, patented 30 Apr 74, 9p PAT-APPL-288 814,
Supersedes PB-230 408.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Amides, *Plasticizers, Aliphatic compounds, Synthesis(Chemistry), Vinyl chloride resins.
Identifiers: *Propionamides, PAT-CL-260-404, Propionamide/N-N-dibutyl-oleoyloxy.

The invention provides symmetrical N,N-dialkyl-2-(oleoyloxy) propionamide, wherein the total number of carbons in the two alkyl groups is from 6 to 14, which is useful as a plasticizer for vinyl chloride resins.

PATENT-3 813 421 Not available NTIS
Department of Agriculture, Washington, D.C.
Use of Epoxides in the Preparation of Higher Fatty Acid Anhydrides.
Patent,
John B. McKelvey, and Ruth R. Benerito. Filed 5 Mar 73, patented 28 May 74, 2p PAT-APPL-337 791,
Supersedes PB-230 154.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Carboxylic acid anhydrides, *Patents, Epoxy compounds, Synthesis(Chemistry).
Identifiers: PAT-CL-260-398.

This invention relates to a process for the preparation of higher fatty acid anhydrides. More particularly, this invention relates to the use of epoxides in preparation of higher fatty acid anhydrides.

PATENT-3 819 580 Not available NTIS
Department of Agriculture, Washington, D.C.
Flame-Resistant Organic Textiles Through Treatment with Halogen Containing Soluble Methylol Phosphine Adducts.
Patent,
Donald J. Daigle, Wilson A. Reeves, and George L. Drake, Jr. Filed 15 Dec 72, patented 25 Jun 74, 6p PAT-APPL-315 753,
Supersedes PB-229 962.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Phosphines, *Carbinols, *Patents, *Phenols, Fire resistant textiles, Polymers, Fire resistant materials, Halogenated hydrocarbons, Textile finishing, Synthesis(Chemistry), Thermosetting resins.
Identifiers: PAT-CL-260-47-P.

The patent concerns soluble methylol phosphine adducts which contain halogen atoms attached to aromatic carbon atoms. They are prepared by reacting tris(hydroxymethyl)phosphine with halogen substituted phenols which contain one or more hydrogens ortho or para to the phenolic hydroxyl group. These adducts are convenient and useful for (a) the preparation of flame-re-

sistant polymers and (b) the preparation of flame- and glow-resistant organic fibrous materials and flame-, glow-, wrinkle-, and shrink-resistant woven and knit textiles which contain about 25 percent or more cellulosic fibers.

PATENT-3 821 196 Not available NTIS
Department of Agriculture, Washington, D.C.
Carbohydrate-Boron Alkoxide Compounds.
Patent,
Jett C. Arthur, Jr., and Malkiat S. Bains. Filed 15 Oct 73, patented 28 Jun 74, 4p PAT-APPL-406 407,
Supersedes PB-233 804.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Alcoholates, *Boron organic compounds, *Cellulose, Chemical reactions, Fire resistant textiles, Carbohydrates, Cotton fabrics.
Identifiers: PAT-CL-260-212.

This invention has as its objective increasing the reactivity of carbohydrates, particularly as their molecular weights increase, with boron alkoxides. As the molecular weight of the carbohydrate increased, its reaction with boron alkoxides neat, in benzene, or in the parent alcohol did not occur or decreased to a very low extent of reaction. It was found that in pyridine or ethylenediamine, the reactivity of carbohydrates toward boron alkoxides increased. Further it was observed that cellulose did not react with the neat alkoxides and reacted with them in pyridine to only a small extent; in ethylenediamine cellulose, both ground and in fiber form, reacted with the alkoxides. Formation of the fibrous cotton cellulose-boron isopropoxide or boron propoxide modifies the rate of oxidation of the cotton cellulose and is related to preparing flame resistant products.

PATENT-3 833 661 Not available NTIS
Department of Agriculture, Washington, D.C.
Novel Process for the Preparation of Tris(Hydroxymethyl) Phosphine and Tris(Hydroxymethyl) Phosphine Oxide.
Patent,
Samuel E. Ellzey, Jr., and William J. Connick, Jr. Filed 18 Jul 72, patented 3 Sep 74, 3p PAT-APPL-272 812,
Supersedes PB-229 959.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Phosphines, *Carbinols, *Phosphine oxides, Synthesis(Chemistry), Ion exchange resins, Anion exchanging, Organic salts, Phosphorus organic compounds.
Identifiers: Methanol/phosphinidyne-tri, Methanol/phosphinylidyne-tri, PAT-CL-260-606-5-P.

This invention provides a method for the preparation of substantially pure tris(hydroxymethyl)phosphine, (HOCH2)3P, and tris(hydroxymethyl)phosphine oxide, (HOCH2)3PO. Tris(hydroxymethyl)phosphine was prepared from tetrakis(hydroxymethyl)phosphonium salts by interaction with one equivalent of a strongly basic anion exchange resin in the hydroxide form. The corresponding phosphine oxide resulted from interaction of the phosphonium salts with an excess of the basic ion exchange resin.

PATENT-3 835 182 Not available NTIS
Department of Agriculture, Washington, D.C.
Dehydroabietic Acid and Ethylene Reaction Products.
Patent,
Walter H. Schuller. Filed 13 Sep 72, patented 10 Sep 74, 5p PAT-APPL-288 807,
Supersedes PB-230 635.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Dibasic organic acids, Ethylene, Polycyclic compounds, Palladium organic compounds, Synthesis(Chemistry), Catalysts.
Identifiers: Podacarpa-8-11-13-trien-15-oic acid/isopropyl, Palladium acetate, PAT-CL-260-468-S.

The patent concerns new compositions of matter which are prepared by reacting ethylene with dehydroabietic acid (or disproportionated rosin) in the presence of palladium (II) acetate to give mixed dimeric dibasic acids.

PATENT-3 844 824 Not available NTIS
Department of Agriculture, Washington, D.C.
Process of Treating Fibrous Materials with the Reaction Product of Methylolphosphine Adducts and Nitrogenous Compounds.
Patent,
Wilson A. Reeves, Darrell J. Donaldson, Donald J. Daigle, George L. Drake, Jr., and John V. Beninate. Filed 15 Nov 72, patented 29 Oct 74, 6p PAT-APPL-306 774,
Supersedes PB-229 958.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Phosphines, *Carbinols, *Fire resistant materials, Fire resistant plastics, Thermosetting plastics, Amines, Amides, Textile finishing, Fire resistant textiles, Fibers.
Identifiers: Methanol/phosphinidyne-tri, PAT-CL-117-136.

The patent describes soluble methylol phosphine adducts which contain one or more methylol phosphine radicals (PCH2OH) which are prepared by reacting in a suitable solvent tris(hydroxymethyl)phosphine with an amide or amine which contains one or more hydrogens attached to trivalent nitrogen. These soluble adducts are particularly valuable for the preparation of thermosetting flame resistant polymers by reacting them with nitrogenous compounds which contain two or more hydrogen and methylol groups attached to trivalent nitrogen. The adducts are also valuable for the preparation of flame-, glow-, wrinkle-, and shrink-resistant knit and woven textiles by causing the adducts to react with nitrogenous compounds in or on the textile structure by application of heat.

PATENT-3 854 867 Not available NTIS
Department of Agriculture, Washington, D.C.
Process for Reacting Sultones with Cellulosic Materials to Produce Cellulosic Materials Having Both Basic and Acidic Groups and Product Produced.
Patent,
Truman W. Ward, Ruth R. Benerito, Ralph J. Berni, and Donald M. Soignet. Filed 15 Nov 72, patented 17 Dec 74, 5p PAT-APPL-306 771,
Supersedes PB-229 969.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Cellulose, *Patents, *Amines, *Ion exchange resins, Sulfur organic compounds, Organic acids, Alkalinity, Textile finishing.
Identifiers: *Sultones, PAT-CL-8-116-R.

The patent concerns cellulosic material reacted with either 2-chloroethyldiethylamine hydrochloride or 2-aminoethylsulfuric acid so that either diethylaminoethyl cellulose or aminized cellulose is formed. These materials are then reacted with a hydrocarbon sultone such as propane sultone in a suitable solvent without catalyst to add the sultone at the nitrogen group. The resultant products have both acidic and basic groups in the same molecule and are zwitterion-exchange celluloses.

PATENT-3 854 868 Not available NTIS
Department of Agriculture, Washington, D.C.
Non-Aqueous Process for Reacting Sultones with Cellulosic Materials and the Product Produced.
Patent,
Truman L. Ward, Ruth R. Benerito, and Ralph J. Berni. Filed 15 Nov 72, patented 17 Dec 74, 5p PAT-APPL-306 770,
Supersedes PB-229 179.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Cellulose, *Patents, Chemical reactions, Sulfur organic compounds, Organic acids, Ion exchange resins, Textile finishing.
Identifiers: *Sultenes, PAT-CL-8-116-R.

The patent concerns a non-aqueous process for reacting sultones with cellulosic materials and cellulose is converted into sodium cellulosate by reaction of the preswollen cellulose with sodium alkoxide and then washed with tertiary butanol prior to reaction with hydrocarbon sultone in tertiary butanol. More sulfur is added by this procedure than when water is present. The sultone solution is not contaminated by base and may be used repeatedly. This reuse of reactants reduces costs and diminishes pollution. The resultant products are useful as ion exchange agents, having active acidic sites, thus making them suitable intermediates for other reactions.

7D. Physical Chemistry

AD-A011 690/5GA PC$4.75/MF$2.25
TRW Systems Group Redondo Beach Calif
Monte Carlo Simulation of Ion Collection by a Rocket-Borne Mass Spectrometer.
Scientific rept.,
Takashi Sugimura. Feb 75, 28p Rept nos. TRW-25717-6001-RU-00, Scientific-1 AFCRL-TR-75-0240
Contract F19628-74-C-0128

Descriptors: *Mass spectrometers, *Ions, Monte Carlo method, Collection, Rocketborne, Atmospheric sounding, Ionosphere.
Identifiers: *Gas sampling.

The parametric study of the ion collection parameters for free molecule flow has been completed for the range of values of practical interest. It has been found that fairly simple relationships can be established for the variation of the ion flux coefficient as a function of any one of the flow parameters; Debye number, speed ratio, and applied potential. Results for the transitional regime show trends similar to the collisionless case. Investigation of vehicle angle of attack and internal molecular degrees of freedom on the ion flux have been started, but preliminary results indicate the effects on the flux coefficient are small.

AD-A011 732/5GA PC$3.25/MF$2.25
General Electric Co Philadelphia Pa Space Div
Infrared Studies of Metal Oxides Upper Limits of the Infrared Oscillator Strengths of UO and UO2.
Final technical rept. 7 Dec 73-1 Oct 74,
Milton J. Linevsky. Apr 75, 14p RADC-TR-75-135
Contract F30602-74-C-0049, ARPA Order-1649
See also AD-772 752.

Descriptors: Infrared spectra, Absorption spectra, Uranium compounds, Oxides, Furnaces, Experimental design.
Identifiers: *Uranium oxides, *Oscillator strengths.

Attempts to obtain infrared absorption spectra for UO and UO2 were carried out using a high temperature furnace technique in which these molecules were produced by heating mixtures of uranium and uranium oxide. No observable absorption was obtained in the region of the vibrational fundamentals of these molecules i.e., 1200/cm to 700/cm. Based on these negative observations upper limits for the oscillator strength of UO and UO2 were estimated.

AD-A011 734/1GA PC$4.25/MF$2.25
United Aircraft Research Labs East Hartford Conn
Energy Transfer in Gas Laser Materials.
Final rept. 16 Mar 69-14 May 75,
Daniel J. Seery. 1975, 72p AFOSR-TR-75-0675
Contract F44620-69-C-0100

Descriptors: *Energy transfer, *Carbon dioxide, *Hydrogen chloride, *Carbon monoxide, Shock tubes, Molecular vibration, Kinetic energy, Particle collisions, Relaxation, Gas lasers, Nitrogen oxides, Combustion, Reaction kinetics, Flames, Experimental design, Gases, Infrared lasers.
Identifiers: Molecular relaxation.

The major efforts in this program have been directed toward an understanding of vibration-vibration and vibration-translation energy transfer for collision partners of interest to high-powered infrared lasers. These studies have all been carried out using the shock tube - infrared emission technique. Reprints and preprints are included: On a shock-tube study of CO2-CO vibrational energy transfer; Intramolecular energy transfer in CO2; Vibrational relaxation of HCl with inert gas collision partner; Vibrational energy transfer in HCl-CO mixtures; and Chemistry of pollutant formation in flames.

AD-A011 735/8GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y
Conduction Electron Spin Resonance in Metallic Calcium,
Pierre Damay, Therese David, and M. J. Sienko.
15 Jul 74, 6p AFOSR-TR-75-0863
Grants AF-AFOSR-2583-74, NSF-GP-17706
Availability: Pub. in Jnl. of Chemical Physics, v61 n10 p4369-4371, 15 Nov 74.

Descriptors: *Electron paramagnetic resonance, *Calcium, Metals, Ammonia, Solutions(Mixtures), Chemical precipitation, Reprints.
Identifiers: Conduction electrons.

The first detection of conduction electron spin resonance (CESR) in metallic calcium is reported. The observation was made feasible through preparation of calcium in a finely divided, ultrapure form by precipitation out of metal-ammonia solution. The measured relaxation time, 1.02 x 10 to the minus 8th power sec, and the g-shift, -0.00195, are comparable to those observed for sodium and potassium. Lineshape asymmetry was observed to increase and line intensity to decrease as the temperature was lowered from 300 K to 4.2 K. The line narrows by about 20% from 300 K to 77 K. (Author)

AD-A011 755/6GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. XXVI. MINDO/3 Calculations for Hydrocarbons,
Richard C. Bingham, Michael J. S. Dewar, and Donald H. Lo. 18 Jul 74, 10p AFOSR-TR-75-0874
Contract F44620-71-C-0119
See also AD-A011 756.
Availability: Pub. in Jnl. of the American Chemical Society, v97 n6 p1294-1301, 19 Mar 75.

Descriptors: *Molecules, *Ground state, *Molecular orbitals, *Hydrocarbons, Computations, Ions, Chemical reactions, Heat of formation, Dipole moments, Chemical bonds, Reprints.
Identifiers: MINDO molecular orbitals, MINDO/3 molecular orbitals.

The MINDO/3 semiempirical SCF-MO method has been tested by calculations for a wide variety of hydrocarbons, for radicals and ions derived from them, and for several simple hydrocarbon reactions. (Author)

AD-A011 773/9GA PC$5.75/MF$2.25
Wayne State Univ Detroit Mich Research Inst for Engineering Sciences
Studies of Atmospheric Processes.
Final rept. 12 Jul 71-30 Jun 74,
Edward R. Fisher, Paul B. Foreman, Barbara B. Krieger, Ralph H. Kummler, and A. Bryan Lees.
Nov 74, 144p AFCRL-TR-74-0584
Contract F19628-72-C-0007, ARPA Order-1856
See also report dated 15 Jun 73, AD-774 450.

Descriptors: *Plumes, *Chemiluminescence, *Infrared spectra, *Energy transfer, Nitrogen compounds, Emission spectra, Scattering cross sections, Molecular vibration, Relaxation, Upper atmosphere, Flow fields, Atmospheric chemistry, Reaction kinetics, Computer programs.
Identifiers: *Oxygen atoms, Atom molecule interactions, Intermolecular potentials, *Molecular relaxation.

This report summarizes experimental and analytical studies on chemistry and energy transfer processes important to rocket exhaust components in the upper atmosphere. The first part covers the experimental studies on chemiluminescence observed in the infrared from reactions in the H-C-N system. The second part presents a compilation of artificial infrared spectra generated to aid in the experimental interpretation of Part I. Part III presents the results of detailed relaxation calculations in an expanding flow of combustion affluents. This calculation, simulating a core flow field, shows substantial vibrational freezing particularly in the diatomic species present. The last part presents detailed measurement of the scattering of 0 atoms from various plume related species. The intermolecular potential for these systems is also determined.

AD-A011 786/1GA PC$3.25/MF$2.25
Sussex Univ Brighton (England) Dept of Chemistry
Bonding Studies of Transition Metal Complexes I. He(I) Photoelectron Spectra of d-0 Silymethyl Derivatives of Group IVA Metals,
M. F. Lappert, J. B. Pedley, and G. Sharp. 29 Jun 73, 9p AFOSR-TR-75-0923
Grant AF-AFOSR-2220-72
Availability: Pub. in Jnl. of Organometallic Chemistry, v66 p271-278 1974.

Descriptors: *Chemical bonds, *Transition metals, *Metalorganic compounds, *Complex compounds, Hafnium compounds, Titanium compounds, Zirconium compounds, Alkyl radicals, Silicon compounds, Photoelectrons, Spectroscopy, Molecular orbitals, Reprints.

The He(I) photoelectron spectra of the compounds MR4 and M'R'4 (M = Ti, Zr, or Hf; M' = M, Ge, or Sn; R = Me3CCH2; R' = Me3SiCH2) have been measured. From these and published data the spectra have been assigned in terms of a localized bond model assuming a tetrahedral MC4 framework. The highest occupied molecular orbital (MO) lies in the range 8-9 eV and is assigned to sigma (M-C) or sigma (M'-C). For isoleptic transition metal alkyls, the highest MO is very insensitive to the nature of the central metal, while for corresponding Group IVB complexes the expected decrease in first ionization potential (IP) due to progressive decrease in electronegativity with atomic number is observed. Small inductive effects of the ligands account for the different IP's of silylmethyl compounds compared with neopentyl derivatives. Observed stability trends are not related to ground state electronic effects. Broadening is observed for the first band in the zirconium and hafnium neopentyls and this is ascribed to a distortion of the MC4 framework to D2d. (Author)

AD-A011 788/7GA PC$3.25/MF$2.25
Sussex Univ Brighton (England) Dept of Chemistry
Activation Parameters for Rotation about a Metal-Carbon Bond from Temperature Dependent Proton N.m.r. Spectra of Rhodium Carbene Complexes,
Michael J. Doyle, and Michael F. Lappert. 11 Jun 74, 4p AFOSR-TR-75-0927
Grant AF-AFOSR-2220-72
Availability: Pub. in Jnl. of the Chemical Society, Chemical Communications, p679-680 1974.

Descriptors: *Rhodium, *Carbon, *Chemical bonds, *Metals, Rotation, Nuclear magnetic resonance, Temperature, Protons, Complex compounds, Carbenes, Activation, Reprints.

Variable temperature proton nuclear magnetic spectra of some rhodium(I) complexes have been measured. The N-ethyl pattern is revealed as of ABX3 type at ambient temperature which gradually reverts to an A2X3 type at higher temperatures. The spectral change is identified as arising from hindrance to rotation about the rhodium-carbon bond. (Author)

AD-A011 793/7GA PC$3.25/MF$2.25
Chicago Univ Ill James Franck Inst
A Quantum Ergodic Theory Approach to Unimolecular Fragmentation,
Sture Nordholm, and Stuart A. Rice. 11 Sep 74, 14p AFOSR-TR-75-0878
Contract F44620-73-C-0005
Availability: Pub. in Jnl. of Chemical Physics, v62 n1 p157-168 1 Jan 75.

Descriptors: *Molecular properties, *Quantum theory, *Reaction kinetics, Molecules, Fragmentation, Scattering, Vibrational spectra, Relaxation, Reprints.
Identifiers: *Unimolecular reactions, *Ergodic theory.

Projection operator techniques are used to separate the complete Hilbert space of a molecular system into parts corresponding to bound and continuum states. The equation of motion of the amplitude associated with an initial excitation of the molecule is then formulated; this equation of motion contains memory effects. Although formally exact, its utility lies in the approximations suggested by its structure. Drawing on recent studies of intramolecular relaxation, a Markovian approximation is formulated and the properties of the model so defined investigated by numerical solution. The decay rate for the model is found to depend strongly upon the nature of the initial excitation, and to correlate with the ergodicity or lack of ergodicity of the initial excitation. When the prepared state is nonergodic, or nearly so, there is a delay in the decay of the molecule. When the state initially prepared is ergodic, there is no such delay. Intermediate cases are also found. It is argued that the formal analysis permits the development of better models and of more sophisticated treatments of the competition between intramolecular relaxation and molecular fragmentation, but that the simple model discussed contains the qualitative elements of importance in such processes. (Author)

AD-A011 894/3GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
High Spatial Resolution Auger Spectroscopy and Auger Integration Applications.
Journal article,
D. J. Pocker, and T. W. Haas. 16 Aug 74, 7p Rept no. ARL-75-0126
Availability: Pub. in Jnl. of Vacuum Science and Technology, v12 n1 p370-374 Jan/Feb 75.

Descriptors: *Auger electron spectroscopy, Auger electrons, Resolution, Signal processing, Spectra, Reprints.

The general approaches to higher spatial resolution Auger spectroscopy as well as the motivation for and relative merit of selected area or point probe analysis are briefly reviewed. A selected area system consisting of a commercial field emission-type scanning electron gun integrated into an existing ultrahigh vacuum Auger system is demonstrated (secondary electron image resolution <0.2 microns Auger spectra of features <2 microns. The Auger spectrum integration and related signal processing utilized to recover acceptable spectra from the low-current/high-noise field emission gun excitation are outlined. Finally, the enhancement of high-energy Auger features observed with the 10-20 keV primary electron irradiation is quantitatively reported for selected elements utilizing integral Auger spectra. (Author)

AD-A011 905/7GA PC$3.75/MF$2.25
Case Western Reserve Univ Cleveland Ohio Electrochemistry Research Lab
Oxygen Electrode Kinetics on Various Electrode Surfaces.
Technical rept.,
Ernest Yeager. 1 May 75, 34p Rept no. TR-42
Contract N00014-75-C-0953

Descriptors: *Oxygen, *Electrochemistry, *Surface reactions, *Reduction(Chemistry), Catalysts, Electrodes, Graphite, Carbon, Gold, Adsorption, Dissociation, Peroxides, Surfaces, Reaction kinetics.
Identifiers: Chemical reaction mechanisms, Fuel cell electrodes.

The results of research on the kinetics of oxygen reduction are presented for various carbon and graphite surfaces and gold. The reduction on these surfaces proceeds through only the peroxide mechanism. This kinetic data provide a quantitative insight into the operation of fuel cell O2 cathodes involving these catalytic surfaces. Promising directions for improving catalytic activity and performance are suggested.

AD-A011 915/6GA PC$4.75/MF$2.25
Tennessee Univ Knoxville Dept of Physics and Astronomy
Technical Reports, 1 October 1974-1 June 1975,
Ivan A. Sellin. 7 Jun 75, 93p Rept no. TR-7501
Contracts N00014-71-A-0121-0002, N00014-75-C-0474
See also report dated 20 Sep 74, AD-786 761.

Descriptors: *Stripped atoms, *Gas ionization, Scientific research, Ions, Electron spectroscopy, Excitation, Electronic states, Electron transitions, Electron emission, Emission spectra, X ray spectra, Atomic energy levels, Particle collisions.
Identifiers: *Projectile electron spectroscopy, Atom ion interactions, Autoionization.

This document is a serial technical report concerning work performed to date on the project entitled 'Structure of High Ionized Heavy Ions and Associated Collision Phenomena in the MeV/Nucleon Range.' Specifically, accumulated reprints of books and articles plus preprints and other abstracts of work to be published are included, together with a catalog of these items. Reports included are entitled: The measurement of autoionizing ion levels and lifetimes by projectile electron spectroscopy; Observation of large and strongly energy dependent directional anisotropies in noncharacteristic K x rays emitted in heavy-ion collisions; Photon energy dependence of the asymmetry of non-characteristic x-radiation in Si-Al and Al-Al collisions; Helium-like 19F: 2 triplet P(2) and P(0) lifetimes; Symmetric ion-atom collisions at medium energies: noncharacteristic radiation; Autoionizing states formed in Na(+) + He and Mg(+) + He collisions at 70 keV; Optically inaccessible core-excited states of Li and Na; Energy dependence of the anisotropy of noncharacteristic x-rays emitted in fast ion-atom collisions.

AD-A011 951/1GA PC$3.25/MF$2.25
Wayne State Univ Detroit Mich
Matrix ENDOR of Polyenyl Radicals in Polymers,
John N. Helbert, Burkhard E. Wagner, Edward H. Poindexter, and Larry Kevan. 10 Sep 74, 12p ARO-9999.14-C
Grant DA-ARO-D-31-124-71-G180
Availability: Pub. in Jnl. of Polymer Science, Polymer Physics Edition, v13 n4 p825-834 Apr 75.

Descriptors: *Vinyl plastics, *Acrylic resins, *Electron spin resonance, *Infrared spectroscopy, Spectroscopy, Chemical radicals, Fluorides, Gamma rays, Reprints.
Identifiers: ENDOR spectra.

EPR and matrix ENDOR spectra have been examined for polyenyl radicals in gamma-irradiated PVF, PVF2, PVC, and PMMA polymers. Proton matrix ENDOR is observed for all four polymers, and fluorine matrix ENDOR for PVF and PVF2. By line shape analysis of the ENDOR spectra obtained under comparable conditions, delocalization diameters for the unpaired electron of the polyenyl radical in each polymer are obtained. These diameters indicate extensive delocalization over 5-7 carbon double bonds for the polyenyl radicals investigated. It is suggested that these conjugated and crosslinked radiation products account for the observed nondevelopment of electron beam resist PMMA material at high radiation charge densities. (Author)

AD-A011 985/9GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Chemistry
Molecular Alignment and Photofragment Spectroscopy.
Technical rept.,
Joyce H. Ling, and Kent R. Wilson. 26 Jun 75, 80p
Contract N00014-69-A-0200-6020

Descriptors: *Molecules, *Alignment, *Photodissociation, Molecular spectroscopy, Optical pumping, Laser beams, Molecular energy levels, Quantum theory.
Identifiers: *Iodine bromide, Photofragment spectroscopy.

By illumination with polarized light, molecules with a dissociative absorption can be aligned by the selective photodissociation of different M states at different rates. The authors have expanded this technique to neutral molecules, demonstrating it for a diatomic, IBr pumped by the second harmonic of a neodymium laser at 18 780/cm, by observing the recoiling Br fragments with photofragment spectroscopy. Classical and quantum calculations of the selective photodissociation effect give equivalent predictions except in the limit in which only a few M states remain populated. Several methods are discussed for experimentally monitoring the degree of alignment as a function of light flux: (a) the change in fragment flux, (b) the change in relative strength of two transitions of different symmetry as reflected in their joint angular distributions, and (c) the change in the shape of the angular distribution of the recoiling atomic fragments for a single transition. Results show that at achievable light fluxes, molecules with dissociative transitions of moderate strength can be strongly aligned. Molecular populations can be prepared which contain only a few M states for each J, or even only M = + or - J. This technique can potentially provide a wide variety of aligned molecules for molecular beam or bulb studies of relaxation as well as elastic, energy transfer and reactive scattering, and can provide further directionality for photon and fragment angular recoil studies.

AD-A012 010/5GA PC$4.25/MF$2.25
United Technologies Research Center East Hartford Conn
Influence of Collision Cross-Sections for Electrons, Atoms and Molecular Systems.
Final rept. 1 Apr 71-31 Mar 75,
H. Harvey Michels. May 75, 53p Rept no. R75-921157 AFOSR-TR-75-0832
Contract F44620-71-C-0066

Descriptors: *Particle collisions, Electronic states, Electron transitions, Electron scattering, Atoms, Molecules, Electrons, Scattering, Energy transfer, Scientific research, Dipole moments, Molecular vibration, Hydrogen, Helium, Carbon dioxide.
Identifiers: Atom electron interactions, Atom atom interactions, Electron molecule interactions, Molecule molecule interactions, Configuration interaction method, *Collision cross section, Dissociative recombination, Nitrogen oxide(NO), Oscillator strengths, Aluminum oxides.

The research performed under this contract was directed toward the analysis of collisional processes involving electrons, ions, and molecules. These collisional processes are of substantial interest in basic kinetic studies, as well as in a number of engineering applications, particularly in the field of propulsion, chemical laser systems and power generation. Several theoretical approaches to predict kinetic cross-sections have been investigated. Research was performed in the areas of electron-atom, electron-molecule, atom-atom, and molecule-molecule collisions. A chronological list is given of the 8 journal and book publications and 24 invited talks from this program.

AD-A012 026/1GA PC$3.25/MF$2.25
Western Australia Univ Nedlands School of Chemistry
Non-Stoichiometric Oxides: Structure, Texture, Thermodynamics and Magnetic Properties.
Final scientific rept.,
B. G. Hyde, and B. N. Figgis. May 75, 11p
AFOSR-TR-75-0833
Grant AF-AFOSR-2312-72

Descriptors: *Titanium oxides, *Phase studies, Titanium, Oxygen, Crystal structure, Magnetic properties, Thermodynamics, Electron microscopy, Diffusion, Australia.
Identifiers: Magnetic susceptibility.

The thermodynamics of the titanium-oxygen system was studied in the composition range of Ti3O5 to TiO2 at 1304K and the anion diffusion rates measured. There was no very marked trend in the diffusion coefficient with composition. A novel technique for studying oxidation/reduction mechanisms in transitional-metal oxides by direct observation in the electron microscope was developed. Studies of rutile-related systems were completed. It revealed the phenomenon of 'swinging CS planes,' where by rotation of the CS plane direction a

continuous sequence of fully ordered structures of varying composition is passible. Magnetic susceptibility of the titanium oxide systems were studied as a function of composition and temperature. The magnetic anisotropy of single crystals in the same composition range has been measured.

AD-A012 056/8GA PC$3.25/MF$2.25
Queen'S Univ Belfast (Northern Ireland) Dept of Applied Mathematics and Theoretical Physics
Electron Density at the Nucleus and the Lamb Shift of 3P Levels of Two-Electron Ions,
A. M. Ermolaev. 2 Dec 74, 6p
Contract N00014-69-C-0035
Availability: Pub. in Physical Review Letters, v34 n7 p380-383, 17 Feb 75.

Descriptors: *Cations, *Electronic states, Helium, Lithium, Reprints.
Identifiers: *Lamb shift, *Triplet states, *Excited states, Oscillator strengths, F values.

AD-A012 070/9GA PC$3.75/MF$2.25
Army Environmental Hygiene Agency Aberdeen Proving Ground Md
Air Pollution Engineering Special Study, Ambient Air Quality Instrument Study, May - December 1974,
Curtis A. Bond, Jr., and William T. Coats. 27 Jun 75, 50p Rept no. USAEHA-21-020-74/75

Descriptors: *Air pollution, *Monitors, *Gas analysis, Instrumentation, Performance(Engineering), Sulfur oxides, Nitrogen oxides, Ozone, Accuracy, Precision, Test methods.
Identifiers: *Air pollution sampling, Air poilution detection.

This study provides an evaluation of the accuracy, precision, availability, and simplicity of operation of selected SO2, NO2, and O3 ambient air monitors. A decision weighting model is used to evaluate the characteristics of simplicity of operation, maintainability, data reduction, and calibration. Interference data are also presented for selected instruments. This study does not constitute an endorsement nor rejection by the Department of the Army of any equipment evaluated and/or used.

AD-A012 179/8GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
Luminescence Due to the Recombination of Free Atoms.
19 Dec 74, 23p Rept no. FSTC-HT-23-0927-74
Trans. from unidentified journals.

Descriptors: *Nitrogen, *Recombination reactions, Electronic states, Molecular energy levels, Luminescence, France, Translations.

Spectrophotometric analysis was used to determine the conditions for selective population of a single electron state in nitrogen. Pressure was found to have no effect on the population distribution in the pressure range studied. Two types of distribution were noted, a Boltzmann distribution for all levels and a characteristic distribution for three levels, and the possible causes for these distributions are examined.

AD-A012 192/1GA PC$3.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y
Oxidation of Clean Ge and Si Surfaces,
R. Ludeke, and A. Koma. 10 Mar 75, 5p ARO-11574.19-P
Contract DAHC04-74-C-0012
Availability: Pub. in Physical Review Letters, v34 n18 p1170-1173, 5 May 75.

Descriptors: *Germanium, *Silicon, *Oxygen, *Adsorption, *Surface chemistry, Oxidation, Chemical bonds, Reprints.

The low-energy-electron loss spectra of oxygen adsorbed at room temperature on clean Si and Ge (100) and (111) surfaces suggest that each oxygen atom is doubly bonded to a surface atom. Using a chemical-bonding argument, it is shown that this complex is also energetically more favorable than previously proposed oxidation models. (Author)

AD-A012 204/4GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
Surface Ionization of Lithium on the 110 and 111 Faces of a Tungsten Single Crystal,
K. Zh. Zhanabergenov, and E. P. Sytaya. 13 Dec 74, 8p Rept no. FSTC-HT-23-164-75
Trans. of Tashkent Univ. Nauchnye Trudy (USSR) n393 p247-253 1971.

Descriptors: *Lithium, *Sodium, *Ionization, *Tungsten, Molybdenum, Surface properties, Filaments, Incandescent lamps, Work functions, Coatings, Molecular beams, Ionic current, Orientation(Direction), Translations, USSR.

Equipment and procedures are described for study of the positive surface ionization of sodium and lithium on uniform surfaces and of sodium on incandescent filaments, in a vacuum of (1-2) X 10 to the -9th power torr. Schottky and Richardson curves and ion current vs. temperature curves are presented. The results are explained by an increase in work function of the surface being studied, with light coatings of sodium and lithium adatoms.

AD-A012 318/2GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
The Influence of Several Separators on the Characteristics of the Negative Electrode of a Lead Accumulator at Low Temperatures,
E. V. Parshikova, A. F. Kalish, L. A. Losyukova, and M. A. Dasoyan. 14 Dec 74, 8p Rept no. FSTC-HT-23-0004-75
Trans. of Elektrotekhnika (USSR) n8 p52-54 1973.

Descriptors: *Surface active substances, *Cathodes(Electrolytic cell), *Lead(Metal), Electrolytic cells, Low temperature, Porous materials, Translations, USSR.
Identifiers: Porous electrodes, Tannins.

Temperature drop will lower certain qualities of an accumulator. This article shows the results of experiments showing the influence of several surface-active substances ('separators') on lead electrodes, at low temperatures. Maximum capacitative qualities were achieved by using tannin No. 4.

AD-A012 325/7GA PC$3.25/MF$2.25
California State Univ San Diego Dept of Chemistry
Solvent and Substituent Effects in the Thermolysis of 1,2-Dioxetanes,
W. H. Richardson, F. C. Montgomery, P. Slusser, and M. B. Yelvington. 4 Apr 74, 4p ARO-12186.3-C
Grant DAHC04-74-G-0210
Availability: Pub. in Jnl. of the American Chemical Society, v97 n10 p2819-2821, 14 May 75.

Descriptors: *Chemical bonds, Solvents, Catalysts, Reaction kinetics, Peroxides, Carbinols, Thermal analysis, Decomposition, Reprints.
Identifiers: *Dioxetanes.

AD-A012 333/1GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Emission Spectra of Heteronuclear Diatomic Rare Gas Positive Ions.
Y. Tanaka, K. Yoshino, and D. E. Freeman. 5 Feb 75, 14p Rept no. AFCRL-TR-75-0358
Availability: Pub. in The Jnl. of Chemical Physics, v62 n11 p4484-4496, 1 Jun 75.

Descriptors: *Diatomic molecules, *Ions, *Rare gases, *Emission spectra, Helium, Neon, Argon, Krypton, Xenon, Reprints.

An electric discharge in a binary mixture of rare gases produces several discrete emission band groups confined to a narrow region characteristics of the pair of rare gases and closely related in energy to the ionization energy difference between the two atoms. Such spectra were observed for nine of the ten binary mixtures of He, Ne, Ar, Kr, and Xe. The energy differences between band groups of a given mixture agree closely with the doublet splittings of the lowest states of the atomic ions. The suggestion is offered that the emission spectrum is carried by the heteronuclear ion (XY)(+) which undergoes a bound-bound charge-transfer transition X+Y yields XY(+) + hv, in which X is the lighter and Y the heavier element in the mixture. (Author)

AD-A012 342/2GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
Monte Carlo Calculations of Neutron and Photon Spectra for the INDI Project.
Final rept.,
G. H. Herling. 10 Jun 75, 12p Rept no. NRL-7886

Descriptors: *Neutron spectrum, *Photons, Monte Carlo method, Dosimetry, Computations, Mathematical models, Neutron flux, Energy storage, Coding.
Identifiers: INDI project.

Coupled neutron-photon multigroup Monte Carlo transport calculations have been carried out with the code MORSE-CG in a model of the INDI experiment. (Author)

AD-A012 356/2GA PC$4.25/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
A Computer Analysis of the Kinetics of the Reaction of Vibrationally Excited Hydrogen with Atomic Oxygen in a Flowing Afterglow Experiment.
Interim rept.,
John H. Birely, Lane A. Darnton, Francis Hai, and Jerome V. V. Kasper. 23 Jun 75, 67p Rept no. TR-0075(5270-20)-3 SAMSO-TR-75-151
Contract F04701-74-C-0075

Descriptors: *Hydrogen, *Exchange reactions, Molecular vibration, Afterglows, Computerized simulation, Excitation, Reaction kinetics, Oxygen, Atoms, Molecular energy levels, Rates, Hydroxyl radicals.
Identifiers: *Oxygen atoms, Reaction rates.

A concerted effort was recently undertaken to gain an understanding of vibrational energy on the rate of the process O + H2(1) to OH(+) + H between atomic oxygen and H2 in its v = 1 level to produce vibrationally excited hydroxyl radicals. The purpose of this study was to test the hypothesis that reaction between ambient O and H2(1) exhausted from the rocket engine is responsible for the intense OH(+) emission observed in field measurements on the plume of a missile burning a noncarbon-containing fuel. A flowing afterglow experiment was carried out to study the process at 300K translational temperature. The extensive computer calculations on the kinetics of the O + H2 system that were performed with the Aerospace NEST computer program and have played a vital role in the planning, data acquisition, and analysis phases of the flowing afterglow experiment are presented in this report. A detailed treatment of the kinetics of the O + H2 system is included for

several limiting assumptions on the effect of reagent vibrational energy on reaction rates.

COM-75-50379/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Approaches to Particulate Analysis in the SEM with the Aid of a Monte Carlo Program.
Final rept.,
H. Yakowitz, D. E. Newbury, and R. L. Myklebust. Apr 75, 10p
Pub. in Proceedings of Annual Scanning Electron Microscope Symposium (8th), St. Louis, Mo., 7-11 Apr 75, Paper in Scanning Electron Microscopy/1975, pt1 p93-102.

Descriptors: *Particles, *Microanalysis, Monte Carlo method, Data processing, Electron probes, Electron scattering, Chemical analysis.
Identifiers: Reprints, *Scanning electron microscopy, X ray fluorescence analysis.

Conventional quantitative electron microanalysis methods have been shown to be satisfactory when semi-infinite, planar specimens normal to the electron beam are analyzed. However, in the case of particulate analysis, the surface may be irregular, the specimen dimensions may be less than the electron beam interaction volume and the x-ray absorption path will be irregular. Currently the only tractable approach to the analysis of particulates is to use a Monte Carlo simulation of electron and x-ray interactions to predict x-ray intensity as a function of particle geometry. A program to carry out this task was devised and tested in several ways for both electron and x-ray parameters. A detailed document of results of these tests, and results on a variety of specimens including aluminum spheres, nickel cylinders, alloy steel wear particles and others show good agreement between theory and experiment.

COM-75-50383/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
X-Ray Photoelectron Spectroscopy (XPS) of Adsorbate Valence Bands.
Final rept.
J. C. Fuggle, T. E. Madey, M. Steinkilberg, and D. Menzel. 24 Feb 75, 2p
Pub. in Physics Letters, v51A n3 p163-164, 24 Feb 75.

Descriptors: *Carbon monoxide, *Adsorption, *Ruthenium, Spectrum analysis.
Identifiers: *X ray photoelectron spectra, Reprints.

The CO valence levels for a monolayer of CO adsorbed on the basal (001) face of ruthenium have been observed by XPS. The assignment of the observed peaks is discussed.

COM-75-50388/8GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Adsorption of Oxygen and Oxidation of CO on the Ruthenium (001) Surface.
Final rept.,
T. E. Madey, H. A. Engelhardt, and D. Menzel. 1975, 25p
Pub. in Surface Science, v48 p304-328 1975.

Descriptors: *Ruthenium, *Adsorption, *Oxygen, *Carbon monoxide, *Surface chemistry, Surface reactions, Oxidation, Catalysis.
Identifiers: Low energy electron diffraction, Reprints.

The adsorption of oxygen on the ruthenium (001) surface has been studied using a combination of techniques: LEED/Auger, Kelvin probe contact poential changes, and flash desorption mass spectrometry. Oxygen is rapidly adsorbed at 300 K, forming an ordered LEED structure having apparent (2 x 2) symmetry. Two binding states of oxygen are inferred from the abrupt change in surface work function as a function of oxygen coverage. LEED intensity measurements indicate that the oxygen layer undergoes an order-disorder transition at temperatures several hundred degrees below the onset of desorption. The order-disorder transition temperature is a function of the oxygen coverage, consistent with two binding states. A model is proposed. The oxidation of CO to form CO2 was found to have the maximum rate of production at a ruthenium temperature of 950K.

NTIS/PS-75/584/3GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
X Ray Fluorescence Analysis (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner. Jun 75, 228p*

Descriptors: *Bibliographies, Abstracts, Experimental design, Laboratory equipment, X ray spectroscopy, X ray fluorescence, X ray analysis, Chemical analysis, Data processing, Spectrochemical analysis, Electron probes.
Identifiers: *X ray fluorescence analysis.

This bibliography covers techniques, apparatus, and applications of x ray fluorescence analysis. Included are references on theory, excitation sources and detectors, and data reduction and analysis. (Contains 223 abstracts)

N75-23724/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
X-Ray Analysis of Metal Traces in Petroleums Using Ion Exchange Membranes.
R. Louis. May 75, 14p NASA-TT-F-16288
Contract NASW-2483
Tran-Transl. Into English from Erdol und Kohle, Erdgas-Petrochem. (Hamburg), V. 23, No. 6, Jun. 1970 p 347-350.

Descriptors: *Crude oil, *Ion exchange membrane electrolytes, *Mineral oils, *X ray analysis, *X ray fluorescence, Diesel fuels, Extraction, Metals, Reaction kinetics.

For abstract, see STAR 1315

N75-23725/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Variations in the Work Function of (100)W by the Adsorption of Oxygen, the Adsorption of Cesium and the Coadsorption of Oxygen and Cesium.
J. L. Desplat. May 75, 11p NASA-TT-F-16364
Contract NASW-2481
Tran-Transl. Into English from Surface Sci. (France), V. 34, 1973 p 588-596.

Descriptors: *Adsorption, *Cesium, *Oxygen, *Work functions, Dipole moments, Helmholtz equations, Materials recovery, Reaction kinetics, Room temperature.

For abstract, see STAR 1315

N75-23726/3GA PC$3.75/MF$2.25
Michigan Univ., Ann Arbor. High Altitude Engineering Lab.
Transmissivity of Carbon Monoxide in the 2.3 Microns Band Region.
Final Report.
S. R. Drayson, R. K. Tallamraju, L. W. Chaney, and A. D. Matthias. May 75, 24p NASA-CR-142869, UMICH-010808-1-F
Contracts NGR-23-005-538, ORA PROJ. 010808

Descriptors: *Absorption spectra, *Carbon monoxide, *Spectral line width, Impurities, Infrared radiation, Line spectra, Nitrogen, Spectral bands.

For abstract, see STAR 1315

N75-23727/1GA PC$4.75/MF$2.25
Nevada Engineering and Technology Corp., Long Beach, Calif.
Correlation of Materials Properties with the Atomic Density Concept.
Interim Final Report.
1975, 98p NASA-CR-120751
Contract NAS8-28517

Descriptors: *Atom concentration, *Atomic physics, *Atomic structure, *Chemical properties, *Density (Mass/volume), Alkali metals, Electron states, Exponents, Ionization potentials, Packing density.

For abstract, see STAR 1315

N75-23752/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Sodium Sulfate: Vaporization Thermodynamics and Role in Corrosive Flames.
F. J. Kohl. 1975, 25p NASA-TM-X-71641, E-8181
Conf-Presented at the Intern. Symp. On Metal-Slag-Gas Reactions and Process., Toronto, Can., 11-16 May 1975; Sponsored by Electrochem. Soc.

Descriptors: *Flames, *Sodium compounds, *Sulfates, *Vaporizing, Computerized simulation, Corrosion, Entropy, Flame temperature, Heat of vaporization, Mass spectrometers.

For abstract, see STAR 1315

N75-23881/6GA PC$5.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Users Manual for a Revised Version of the Langley Charring Ablator Program.
C. W. Stroud, and K. L. Brinkley. 1975, 121p
NASA-TM-X-72677

Descriptors: *Materials tests, *Thermal protection, *Transient response, *User manuals (Computer programs), Ablation, Pyrolysis, Reaction kinetics.

For abstract, see STAR 1315

N75-24438/4GA PC$3.25/MF$2.25
Nebraska Univ., Lincoln. Behlen Lab. of Physics.
Vibrational Intensity Distributions for Continuum Photoionization of Oxygen.
J. L. Gardner, and J. A. R. Samson. 1975, 5p
NASA-CR-142748
Contract NGR-28-004-021
Subm-Sponsored in Part by NSF.

Descriptors: *Oxygen, *Photoionization, *Vibrational spectra, Helium, Ionization cross sections.
Identifiers: NTISNSF.

For abstract, see STAR 1315

N75-24439/2GA PC$3.25/MF$2.25
Alabama A & M Univ., Normal. Dept. of Physics and Mathematics.
Difference Equation for Superradiance.
C. T. Lee. 1974, 10p NASA-CR-142875
Grant NSG-8011

Descriptors: *Difference equations, *Radiance, Atomic excitations, Coherent radiation, Conservation equations, Independent variables, Photons, Radiation distribution.

For abstract, see STAR 1315

N75-24440/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Behavior of Atomic H in Solid H2 from 0.2 to 0.8 K.
R. W. H. Webeler. 1975, 6p NASA-TM-X-71732, E-8360
Conf-Presented at the Meeting of the Amer. Phys. Soc., Washington, D. C., 28 Apr. - 1 May 1975.

Descriptors: *Hydrogen, *Low temperature, *Monatomic gases, *Solidified gases, Magnetic fields, Performance, Rocket propellants.

For abstract, see STAR 1315

N75-24441/8GA PC$5.25/MF$2.25
Virginia Polytechnic Inst. and State Univ., Blacksburg.
Study of the Reaction of Atomic Oxygen with Aerosols.
Final Report.
F. I. Akers, and J. P. Wightman. May 75, 111p NASA-CR-2529
Contract NAS1-10646

Descriptors: *Aerosols, *Chemical reactions, *Oxygen atoms, Ammonium chlorides, Chemical reactors, Chemiluminescence, Microwave emission, Monatomic gases, Ozone, Reaction kinetics.

For abstract, see STAR 1315

PB-242 650/0GA PC$7.00/MF$2.25
Avco Everett Research Lab., Inc., Everett, Mass.
Study of the Interaction of Plasma Proteins with Prosthetic Surfaces.
Annual rept. no. 2, 1 Dec 73-30 Nov 74,
E. Nyilas, T-H. Chiu, D. M. Lederman, and G. A. Herzlinger. Feb 75, 176p NIH/NHLI-N01-HB-3-2917-2
Contract N01-HB-3-2917
See also report dated 1974, PB-231 776.

Descriptors: *Blood proteins, *Surface chemistry, *Prosthetic devices, Blood plasma, Adsorption, Surface properties, Thermodynamics, Electrophoresis, Globulins, Lipoproteins.
Identifiers: Blood compatible materials, Biomaterials.

The interaction of synthetic surfaces with selected human native plasma proteins each of which was dissolved in a standardized buffer pH = 7.2, I = .05 has been studied in the following areas. (1) Adsorption isotherms of scrum albumin, gamma-7S-globulin (gamma-GLB) and beta-lipo protein were obtained. (2) The heats of adsorption of gamma-GLB were microcalorimetrically determined. (3) The surface charge of and the state of ions on GPP were deduced from the electrophoretic mobilities of bare and gamma-GLB coated particles. (4) The enthalpy of the temperature-induced transition of gamma-GLB dissolved in the buffer was determined. (5) The state of water bound to the GPP was assessed. (6) Assuming that protein sorption involves the displacement of bound water and buffer ions, a first-order thermodynamic analysis of the gamma-GLB/GPP system is presented which is based on the results of studies described above.

7E. Radio and Radiation Chemistry

AD-A011 908/1GA PC$3.75/MF$2.25
Boston Univ Mass Dept of Chemistry
Valence Photoisomerization of 1-Ethoxycarbonyl-1H-Azepine and Its Thermal Reversion. Quantitative Aspects.
Technical rept. 2, 1 Jul 74-31 May 75,
Guilford Jones, II, and Laura J. Turbini. 15 Jun 75, 29p
Contract N00014-67-A-0280-0003, ARPA Order-2721

Descriptors: *Photochemical reactions, Quantum efficiency, Nitrogen heterocyclic compounds, Molecular isomerism.
Identifiers: *Isomerization, *Azepines.

Photolysis of 1-ethoxycarbonyl-1H-azepine in solution at 325 - 385 nm gives a valence isomer with a chemical efficiency of 95% and a quantum efficiency of 0.013. The valence isomer reverts cleanly to azepine at 112 - 145C in an uncatalyzed reaction which is exothermic. The valence isomerization can be driven by sunlight and laser emission at 458 nm and cycled in sequential photochemical and thermal steps. The azepine does not luminesce but the energies of S(1) (reactive) and T(1) (unreactive) excited states can be estimated from sensitization and quenching experiments.

AD-A012 024/6GA PC$3.25/MF$2.25
California Univ Los Angeles Inst of Geophysics and Planetary Physics
The Chemistry of Materials under Extreme Environmental Conditions.
Final rept. 1 Dec 70-31 Mar 75,
W. F. Libby. 1975, 18p AFOSR-TR-75-0834
Grant AF-AFOSR-2019-71

Descriptors: *Catalysts, *Rare earth compounds, *Plasmas(Physics), *Radiation chemistry, Scientific research, Atmospheric chemistry, Radiolysis, Ionizing radiation, Crystals, Diamonds, High pressure, Planetary atmospheres.
Identifiers: *Electron tunneling.

Research is briefly summarized in the areas of rare earth auto exhaust catalysts, plasma chemistry, high pressure inorganic chemistry, radiation damage in crystals, electron tunneling in chemistry, and high pressure organic chemistry.

AD-A012 276/2GA PC$3.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Photodissociation and Photodetachment of Molecular Negative Ions. I. Ions Formed in CO2/H2O Mixtures.
Interim rept. 1 Jan-31 Dec 74,
J. T. Moseley, P. C. Cosby, R. A. Bennett, and J. R. Peterson. Jun 75, 39p BRL-CR-236
Contract DAHC04-73-C-0016
See also AD-A012 277.

Descriptors: *Carbon dioxide, *Water vapor, *Anions, *Photodissociation, Complex compounds, Excitation, Atmospheric chemistry, D region.
Identifiers: Photodetachment, Drift tube mass spectroscopy.

A drift tube mass spectrometer and an argon ion laser have been used to study photon interactions with CO3(-), CO3(-)-H2O, HCO3(-) and HCO3(-)-H2O at discrete photon energies between 2.35 and 2.71 eV. Cross sections are reported.

AD-A012 277/0GA PC$3.75/MF$2.25
Stanford Research Inst Menlo Park Calif
Photodissociation and Photodetachment of Molecular Negative Ions. II. Ions Formed in Oxygen.
Interim rept. 1 Jan-31 Dec 74,
P. C. Cosby, R. A. Bennett, J. R. Peterson, and J. T. Moseley. Jun 75, 42p BRL-CR-238
Contract DAHC04-73-C-0016
See also AD-A012 276.

Descriptors: *Oxygen, *Anions, *Photodissociation, Dye lasers, Tunable lasers, Atmospheric chemistry, D region, Electron density.
Identifiers: Drift tube mass spectroscopy.

Total photodestruction cross sections for O2(-), O3(-), and O4(-) ions have been measured over a photon energy range of 1.93 to 2.71 eV using a drift tube mass spectrometer coupled with an argon ion laser and a tunable dye laser. Cross sections are reported. Structure indicative of the vibrational levels of a predissociating excited state was observed.

COM-75-10737/5GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Office of Standard Reference Data.
Selected Specific Rates of Reactions of Transients from Water in Aqueous Solution. Hydrated Electron, Supplemental Data,
Alberta B. Ross. Jun 75, 52p NSRDS-NBS-43-Suppl
Sponsored in part by Atomic Energy Commission, Washington, D.C. Prepared in cooperation with Notre Dame Univ., Ind. Radiation Chemistry Data Center. Paper copy also available from GPO as C13.48:43, Suppl. See also Basic rept., COM-73-50537.

Descriptors: *Hydrates, *Solutions, *Radiation chemistry, Reaction kinetics, Organic compounds, Chemical reactions, Electrons, Inorganic compounds, Tables(Data).
Identifiers: *Reaction rates, *Solvated electrons, Chemical radicals.

A compilation of rates of reactions of hydrated electrons with other transients and with organic and inorganic solutes in aqueous solution appeared in NSRDS-NBS 43, and covered the literature up to early 1971. This supplement includes additional rates which have been published through July 1973.

N75-24455/8GA PC$3.75/MF$2.25
Interuniversitair Reactor Instituut, Delft (Netherlands).
Ionization in the Track of a High-Energy Electron in Hydrocarbon Liquids. Study of Positive and Negative Ion Scavenging Using Nanosecond Pulse Radiolysis.
E. Zador, J. Warman, and A. Hummel. 1974, 47p IRI-133-74-06

Descriptors: *Charged particles, *High energy electrons, *Hydrocarbons, *Life (Durability), Distribution (Property), Ionization, Particle trajectories, Radiolysis, Recombination reactions, Scavenging.

For abstract, see STAR 1315

8. EARTH SCIENCES AND OCEANOGRAPHY

8A. Biological Oceanography

AD-A011 883/6GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Nutrient Transports through Lancaster Sound in Relation to the Arctic Oceans's Reactive Silicate Budget and the Outflow of Bering Strait Waters.
Technical rept.,
L. A. Codispoti, and T. G. Owens. 14 Mar 74, 6p
Rept nos. TR-333, Contrib-783
Contract N00014-67-A-0103-0014
Availability: Pub. in Limnology and Oceanography, v20 n1 p115-119 Jan 75.

Descriptors: *Marine biology, *Ocean currents, Silicates, Transport, Bering Sea, Concentration(Composition), Nutrition, Reprints.

Data from the Lancaster Sound region help balance the Arctic Ocean's reactive silicate budget, but a net removal is still indicated. The reactive phosphorus and reactive silicate concentrations in Lancaster Sound suggest an enrichment with Bering Strait waters. (Author)

Group 8A—Biological Oceanography

AD-A011 886/9GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
The Effect of Hydrostatic Pressure on Respiratory Electron Transport System Activity in Marine Zooplankton.
Technical rept.,
F. D. King, and T. T. Packard. 7 May 74, 7p Rept nos. TR-336, Contrib-803
Contract N00014-67-A-0103-0014, Grant NSF-GA-34165
Availability: Pub. in Deep-Sea Research, v22 p99-105 1975.

Descriptors: *Plankton, Marine biology, Electron transport, Hydrostatic pressure, Respiratory system, North Pacific Ocean, Puget Sound, Reprints.
Identifiers: Zooplankton.

The pressure dependence of the respiratory electron transport system (ETS) activity was investigated in four species of zooplankton from Puget Sound and in mixed populations of zooplankton from the eastern tropical North Pacific Ocean. The Puget Sound zooplankton showed no significant pressure effect between 1 and 100 atm, the maximum range of pressure these organisms are likely to encounter in nature. The mixed zooplankton, from both epipelagic and bathypelagic waters, showed no significant pressure effect at 265 atm. (Author)

AD-A011 889/3GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
The Effect of Temperature on the Respiratory Electron Transport System in Marine Plankton.
Technical rept.,
T. T. Packard, A. H. Devol, and F. D. King. 10 Feb 74, 14p Rept nos. TR-344, Contrib-826
Contract N00014-67-A-0103-0014, Grant NSF-GA-34615
Availability: Pub. in Deep-Sea Research, v22 p237-249 1975.

Descriptors: *Plankton, *Marine biology, Metabolism, Respiratory system, Energy transfer, Electron transport, Thermoclines, Oceanographic data, Enzymes, Reprints.

The effect of temperature on the respiratory electron transport system in plankton was studied in plankton populations between 10 and 45 N lat in the eastern Pacific Ocean. The results yielded Arrhenius activation energies of 15.8 + or - 2.8 kcal/mole for microplankton, 16 kcal/mole for epipelagic zooplankton and 13.2 kcal/mole for bathypelagic zooplankton. The differences among these values were not statistically significant.

COM-75-10847/2GA PC$3.25/MF$2.25
Delaware Univ., Newark. Coll. of Marine Studies.
Benthic Invertebrates in Delaware Bay: Animal-Sediment Associations of the Dominant Species,
Peter Kinner, Don Maurer, and Wayne Leathem. May 75, 20p DEL-SG-10-75 NOAA-75052002
Grant NOAA-2-35223

Descriptors: *Delaware Bay, *Invertebrates, *Benthos, Estuaries, Tables(Data), Sampling, Sediments, Bays(Topographic features), Ecology, Limnology.
Identifiers: Sea Grant program.

The purpose of the study was to determine the composition of the benthic fauna near the mouth of Delaware Bay. One hundred and five species were collected and identified from 277 grab samples. A sediment sample was also collected at each of the stations. Faunal density was low with the number of individuals rarely exceeding 10/0.1 sq m. Species were ranked according to number of individuals; the (redundancy) was not significantly different in any of the sediment types.

COM-75-10909/0GA PC$8.50/MF$2.25
Alaska Univ., College. Inst. of Marine Science.
Environmental Study of the Marine Environment Near Nome, Alaska,
D. W. Hood, V. Fisher, D. Nebert, H. M. Feder, and G. J. Mueller. Jul 74, 260p IMS-R74-3, Sea Grant-73-14 NOAA-75060503
Grants NOAA-04-3-158-41, NSF-GD-31610
Sponsored in part by American Smelting and Refining Co., Salt Lake City, Utah.

Descriptors: *Ocean environments, *Oceanographic data, Marine biology, Suspended sediments, Metals, Trace elements, Marine microorganisms, Primary biological productivity, Biomass, Invertebrates, Chemical properties, Nutrients, Socioeconomic status, Circulation, Alaska, Norton Sound.
Identifiers: Sea Grant program, Nome(Alaska).

The purpose of this study was to collect baseline data to define the sedimentary, biological, and physical-chemical environments in the vicinity of Nome. The investigation included: A determination of the surficial bottom sediments including suspended sediment loads and trace metal content of the sediments; the collection and identification of bottom dwelling organisms; a few estimates of water column primary productivity; studies of the hydrography circulation patterns and oxygen distributions, the nutrient levels and trace metal content of the water column, and the socio-economic status of the town of Nome.

8B. Cartography

AD-A012 176/4GA PC$4.25/MF$2.25
Army Engineer Topographic Labs Fort Belvoir Va
Single Photo Analysis of Sampled Aerial Imagery.
Research note,
Micnael A. Crombie, Philip G. Lem, and Thomas A. Hay. Aug 74, 51p Rept no. ETL-RN-74-10

Descriptors: *Aerial photography, *Stereophotogrammetry, Image processing, Histograms, Compacting, Correlation techniques.
Identifiers: Scene analysis, CalComp plotters.

Three single photo analyses of aerial photography using digital techniques are presented. A statistical description of thirty scenes taken from two stereo models is presented with a preliminary matching analysis using correlation procedures and a preliminary compaction analysis using Fourier techniques. Preliminary results indicate that image compaction using Fourier techniques is feasible and promising. Several useful properties of image matching were revealed in the analysis.

N75-24063/0GA PC$4.75
California Univ., Berkeley. Forestry Remote Sensing Lab.
A Survey of Earth Resources on APOLLO 9 Photography.
R. N. Colwell. 25 Apr 69, 83p NASA-CR-142900
Contract NAS9-9348
Misc-Original Contains Color Illustrations.

Descriptors: *Apollo 9 flight, *Earth resources, *Earth resources program, *Spaceborne photography, Aerial photography, Earth resources survey aircraft, Satellite observation.

For abstract, see STAR 1315

N75-24069/7GA PC$3.75/MF$2.25
Georgia Inst. of Tech., Atlanta. Engineering Experiment Station.
Study of Usgs/NASA Land Use Classification System.
Final Report.
G. W. Spann. Mar 75, 40p NASA-CR-120763, GIT-A-1621
Contract NAS8-30653

Descriptors: *Computer techniques, *Land use, *Landsat satellites, *Mapping, *Satellite observation, Cost analysis, User requirements.

For abstract, see STAR 1315

8C. Dynamic Oceanography

AD-A011 775/4GA PC$4.75/MF$2.25
Physical Dynamics Inc Berkeley Calif
Coupling of Surface and Internal Gravity Waves: A Hamiltonian Model.
Technical rept.,
Kenneth M. Watson, Bruce J. West, and Bruce T. Cohen. Apr 74, 88p Rept no. PD-72-032 RADC-TR-74-129
Contract F30602-72-C-0494, ARPA Order-1649

Descriptors: *Ocean waves, *Internal waves, Surface waves, Spectrum analysis, Hamiltonian, Partial differential equations.
Identifiers: *Internal gravity waves.

The dynamics of the coupling of linear internal gravity waves and linear surface gravity waves on the ocean is studied using a Hamiltonian formalism and action-angle variables. The dynamic equations are solved both numerically and in some analytic approximations. The results compare favorably with the interaction experiments of Lewis, Lake and Ko the 'resonant triad' experiments of Joyce and some satellite observations of Apel et al. The growth time for internal waves generated by the resonant interaction of surface waves is calculated using the Garrett-Munk ocean model and the Phillips spectrum for surface waves. Energy exchange rates are deduced.

AD-A011 817/4GA PC$4.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
A Statistical and Spectral Analysis of the Air-Sea Interactions at OWS NOVEMBER.
Technical paper,
Kevin Rabe, and Robert H. Bourke. May 75, 90p Rept no. ENVPREDRSCHF-tech paper-9-75

Descriptors: *Oceanographic data, *Air water interactions, *North Pacific Ocean, Surface temperature, Ocean surface, Atmospheric temperature, Wind velocity, Salinity, Heat transfer, Spectrum analysis, Barometric pressure, Cloud cover, Time series analysis, Regression analysis, Correlation techniques.
Identifiers: *November ocean station.

Oceanographic and meteorological data from Ocean Weather Station (OWS) NOVEMBER were analyzed by statistical and spectral methods in order to describe the nature and periodicities of the air-ocean energy exchange. Salinity data from 1968 through 1970 were compared with daily observed parameters commonly associated with changes in the salinity. Regression analysis showed surface salinity to be highly correlated with surface pressure which is interpreted as the surface salinity responding to a baroclinic transport. Twenty-four years (1947-1970) of daily averaged, observed climatological values, as well as heat exchange terms computed from them, were compared with the sea-surface temperature time series and spectrally analyzed.

AD-A011 885/1GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Tides at Cobb Seamount.
Technical rept.,
Larry H. Larsen, and James D. Irish. 7 Oct 74, 5p Rept nos. TR-335, Contrib-818
Contract N00014-67-A-0103-0014, Grant NSF-GA-30745X
Availability: Pub. in Jnl. of Geophysical Research, v80 n12 p1691-1695, 20 Apr 75.

Descriptors: *Seamounts, *Tides, Wave propagation, *Ocean waves, Recording systems, Oceanographic data, North Pacific ocean, Sampling, Time series analysis, Reprints.
Identifiers: Cobb seamount.

The diurnal and semidiurnal tidal constituents are calculated at Cobb seamount, latitude 46 46.4 N and longitude 130 48.8 W. The semidiurnal constituents agree with a model of Kelvin wave propagation north along the Pacific coast. The diurnal constituents do not agree with the Kelvin wave model. We also illustrate the application of an optimal interpolating formula to a time series consisting of the value and trend at each data point. (Author)

AD-A011 888/5GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Effects of Continental Slope and Variable Brunt-Vaisala Frequency on the Coastal Generation of Internal Waves.
Technical rept.,
S. J. Prinsenberg, and Maurice Rattray, Jr. 4 Feb 74, 14p Rept nos. TR-343, Contrib-814
Contract N00014-67-A-0103-0014, Grant NSF-GA-30745X
Availability: Pub. in Deep-Sea Research, v22 p251-263 1975.

Descriptors: *Internal waves, *Continental shelves, *Tidal currents, Depth finding, Ocean bottom, Energy transfer, Wave propagation, Time dependence, Oceanographic data, Reprints.
Identifiers: Brunt Vaisala frequency.

Internal waves of significant amplitudes can be generated when long surface waves pass over a depth profile approximating the continental shelf. In addition to the shelf-generated beam with a vertical depth twice the depth and its center along the characteristic emanating from the surface above the shelf, wave energy is generated from an inclined slope that interfaces with the oceanic beam constructively sloping below and destructively above the center of the downwards propagating beam. After reflection from the oceanic bottom the additional energy adds to the oceanic beam's energy above its center and substracts below its center. The magnitude of this effect increases as the inclination of the slope approaches that of the internal wave characteristics. For a Brunt-Vaisala frequency decreasing with depth, the vertical extent of the oceanic beam increases as it propagates downward from the generating region. The spreading of the adjacent characteristics with depth decreases the energy density; however, because of the simultaneous steepening of the characteristics, the vertical displacements are not so strongly affected. (Author)

AD-A011 890/1GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Microstructure and Intrusions in the California Current.
Technical rept.,
M. C. Gregg. 29 Jul 74, 27p Rept no. TR-345
Contract N00014-67-A-0103-0014
Availability: Pub. in Jnl. of Physical Oceanography, v5 n2 p253-278 Apr 75.

Descriptors: *Ocean currents, Shallow water, Pacific Ocean, Microstructure, Turbulence, Oceanographic data, Thermoclines, Probability distribution functions, California, Reprints.

Two microstructure records taken at shallow depths off Cabo San Lucas, at the southern tip of Baja California, are compared. One is similar to records previously taken in the mid-gyre, and has an 'irregularly steppy' appearance, a linear T-S relation, and a Cox number of approximately 10. It is suggested that this type of profile may represent the background condition of the ocean in which the levels of vertical turbulence are quite low and the principal dissipation occurs by small-scale shear instabilities at the 'step' structures. The other record exhibits a very irregular T-S relation, due to multiple interleavings of the water masses present in the area. Coupled with this is an average Cox number of at least 6000 and a much greater variability in the local microstructure levels along the record; half-meter averages of the dissipation rate of temperature fluctuations show a range greater than 10 to the six power. In some cases these differences occur over vertical separations of a few meters. (Author)

AD-A011 891/9GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Measurement of Internal Waves of Tidal Frequency Near a Continental Boundary.
Technical rept.,
W. Barbee, J. Dworski, J. D. Irish, L. Larsen, and M. Rattray, Jr. 15 Jul 74, 11p Rept nos. TR-346, Contrib-811
Contract N00014-67-A-0103-0014, Grant NSF-GA-30745X
Availability: Pub. in Jnl. of Geophysical Research, v80 n15 p1965-1974, 20 May 75.

Descriptors: *Internal waves, *Continental shelves, *Tidal currents, Shallow water, Oceanographic data, Energy transfer, Temperature measuring instruments, Profiles, Thermoclines, Reprints.

We have measured the internal wave field seaward of the continental shelf break off Vancouver Island, British Columbia, with an array of four moored temperature sensors and numerous STD casts. These measurements have been analyzed for their energy content at the semidiurnal tidal frequency, and the results compared with a theory of generation of internal tides at a shelf break. A peak in amplitude is observed at a depth slightly greater than that predicted by the theory. The observed phase change across this peak is consistent with seaward propagation of energy from the shelf break. (Author)

AD-A012 035/2GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Uniform Ray Theory of Surface, Internal and Acoustic Wave Propagation in a Rotating Ocean or Atmosphere,
M. C. Shen, and J. B. Keller. 23 Oct 73, 20p Rept no. NYU-ONR-H53
Contract N00014-67-A-0467-0006, Grant NSF-GP-28699
Availability: Pub. in SIAM Jnl. on Applied Mathematics, v28 n4 p857-875 Jun 75.

Descriptors: *Wave propagation, *Mechanical waves, *Atmospheric physics, *Ocean waves, Ray tracing, Surface waves, Internal waves, Reprints.
Identifiers: *Dynamic oceanography, *Atmospheric waves, Caustic surfaces.

First a short wavelength asymptotic expansion, employing rays, is presented for waves propagating in a rotating compressible fluid layer of nonuniform depth. This theory applies to surface, internal and acoustic waves in an ocean or atmosphere. It yields infinite amplitudes at caustics and shorelines. Therefore two different asymptotic expansions, uniform in a region containing a caustic and a shoreline respectively, are constructed. The yield the correct finite amplitude at the caustic and at the shoreline. In addition, expansions uniform in a region containing a caustic and a shoreline, or two or more caustics and shorelines, are constructed. Both general time-dependent waves and time-harmonic waves are considered. Linear theory is employed. (Author)

COM-75-10842/3GA PC$3.25
Scripps Institution of Oceanography, La Jolla, Calif.
Internal Surges in Coastal Waters,
Clinton D. Winant. 15 Jul 74, 5p NOAA-75052012
Sponsored in part by National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant, and Office of Naval Research, Arlington, Va. Pub. in Jnl. of Geophysical Research, v79 n30 p4523-4526, 20 Oct 74.

Descriptors: *Ocean waves, *Ocean surface, *Coasts, Temperature gradients, Ocean tides, Motion, Water pressure, Thermoclines, Measurement, Thermistors, California.
Identifiers: *Internal waves, Sea Grant program, La Jolla(California), Reprints.

A multiple element thermistor chain was installed at the end of Scripps pier in La Jolla, California, in five m of water along with a pressure sensor to record sea surface fluctuations. Temperature fluctuations throughout the water column are characterized by the occurrence of events, times during which a significant thermal gradient exists in the water column. Temperature differences between the bottom and the surface of up to 5C have been measured. The work reports (1) that the onset of events can be very rapid, occurring during times of the order of 1 s, (2) that motions exist in the water column at frequencies much higher than the buoyancy frequency that are not directly coupled to the surface wave field, and finally (3) that events are likely to be strongly three-dimensional in such shallow waters.

COM-75-10856/3GA PC$5.25/MF$2.25
Rosenstiel School of Marine and Atmospheric Science, Miami, Fla.
Refraction of Surface Gravity Waves in an Eddy.
Master's thesis,
William Joseph Teague. Dec 74, 103p UM-RSMAS-74034 NOAA-75053007
Grant NOAA-04-4-022-24

Descriptors: *Ocean waves, *Eddies, *Gravity waves, *Wave interference, Sea states, Remote sensing, Ocean currents, Partial differential equations, Computer programs, Refraction, Mexico Gulf, Surface waves, Theses.
Identifiers: Geometrical optics.

The refraction of surface gravity waves by current fields is examined through the use of a geometrical optics approximation. It is found that for realisitic mid-ocean eddy structures, significant sea state enhancement may occur well outside the region of circulation. A characteristic 'signature' is associated with the flow pattern, which depends only on the vorticity pattern. The signature of the cyclonic eddy is basically a double caustic formation behind the eddy, with the caustic region more intensive on the left. The implications of the signature pattern are studied for the exchange of momentum between waves and currents. An estimate of the rate of energy loss through wave breaking indicates that the rate of eddy decay may be significantly affected. The study of signatures has potential in remote sensing by both passive and active microwave techniques.

COM-75-10889/4GA PC$8.50/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Sea Grant Project Office.
Mathematical Modeling of Near Coastal Circulation,
John D. Wang, and Jerome J. Connor. 20 Apr 75, 274p MITSG-75-13 NOAA-75060506
Index No. 75-313-Cbs.

Descriptors: *Ocean currents, *Circulation, *Coasts, Hydrodynamics, Boundary layer, Mathematical models, Numerical analysis, Wind(Meteorology), Tides, Differential equations, Momentum, Theses.

Identifiers: Sea Grant program, Finite element analysis.

Hydrodynamic circulation in coastal waters is formulated in terms of mathematical models. A systematic discussion of the derivation of a set of governing equations, expressing conservation of mass and momentum is presented. A simplification is introduced by integrating all variables and equations over the total water depth. The derivation of the vertically integrated formulation for one and two layered situations is discussed along with the underlying assumptions and closure problems. The treatment of boundaries and boundary conditions is given particular attention. By analogy to the mechanics of a particle, it is postulated that the admissible boundary conditions must either be in terms of forces or discharges.

COM-75-10890/2GA PC$4.25/MF$2.25
National Oceanic and Atmospheric Administration, Honolulu, Hawaii. Joint Tsunami Research Effort.
The Outer Boundary Integral Equation Method Applied to Wave Scattering in an Infinite, Localiy Inhomogeneous Medium,
Richard Paul Shaw. Sep 74, 67p NOAA-JTRE-126 NOAA-75061004
Prepared in cooperation with Hawaii Inst. of Geophysics, Honolulu. Rept. no. HIG-74-6.

Descriptors: *Ocean waves, *Integral equations, *Finite difference theory, Time series analysis, Gravity waves, Partial differential equations, Numerical integration, Computer programs.

The scattering of time harmonic and transient waves by an obstacle in a locally inhomogeneous infinite medium, i.e., a medium which becomes essentially homogeneous at some distance from the obstacle, is treated. An artificial outer boundary is drawn within the homogeneous region, and an outer boundary integral equation is used to relate the dependent variable and its normal derivative at this boundary. This in turn is used to complete another set of equations obtained by standard techniques, e.g., finite differences, for the inhomogeneous interior region. Numerical examples are given for water-wave scattering by a circular island surrounded by various locally variable depth topographies.

COM-75-10900/9GA PC$6.25/MF$2.25
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
Surface Wave Height Measurements Made Near the Oregon Coast During August 1972, and July and August 1973.
Technical rept.,
David Halpern, Jonathan M. Helseth, James R. Holbrook, and R. Michael Reynolds. Apr 75, 174p NOAA-TR-ERL-324, PMERL-22 NOAA-75061205
Paper copy also available from GPO as C55.13:ERL 324-PMEL-22.

Descriptors: *Ocean waves, *Coasts, North Pacific Ocean, Ocean currents, Upwelling, Measurement, Buoys, Ocean surface, Circulation, Statistical data, Power spectra, Histograms, Data processing, Data acquisition, Oregon.
Identifiers: International decade of ocean exploration.

Summaries of surface wave height measurements made August 1972 and during July and August 1973 with a Datawell Waverider buoy moored in 100-meter depth off the Oregon coast are presented in computer-generated output as standard statistics, histograms, and spectra.

COM-75-10901/7GA PC$3.75/MF$2.25
National Weather Service, Silver Spring, Md. Office of Hydrology.
Storm Tide Frequency Analysis for the Gulf Coast of Florida from Cape San Blas to St. Petersburg Beach.
Technical memo.,
Francis P. Ho, and Robert J. Tracey. Apr 75, 40p NOAA-TM-NWS-HYDRO-20 NOAA-75061111

Descriptors: *Storm surges, *Ocean tides, *Florida Gulf Coast(United States), Tropical cyclones, Probability theory, Hurricanes, Mathematical models, Hydrodynamics, Hurricane tracking, Risk, Insurance, Tables(Data), Cape San Blas.
Identifiers: Water levels, Hurricane Agnes.

Storm tide height frequency distributions are developed for the Gulf coast of Florida from Cape San Blas to St. Petersburg Beach for the National Flood Insurance program. Storm tides are computed from a full set of climatologically representative hurricanes, using the National Weather Service hydrodynamic storm surge model. Tide levels are shown in coastal profile between annual frequencies of 0.10 and .002. This report is to be used in estimating actuarial risk to buildings from coastal floods and in land use management.

COM-75-10902/5GA PC$5.75/MF$2.25
National Oceanic and Atmospheric Administration, Seattle, Wash. Pacific Marine Environmental Lab.
Observations of Currents and Water Properties in Puget Sound, 1973.
Technical rept.,
N. P. Laird, and Jerry A. Galt. May 75, 146p NOAA-TR-ERL-327, PMEL-23 NOAA-75061207
Paper copy also available from GPO as C55.13: ERL 327-PMEL 23.

Descriptors: *Ocean currents, *Oceanographic data, *Puget Sound, Circulation, Ocean surface, Temperature measurement, Salinity, Depth, Graphs(Charts), Tables(Data), Oceanographic surveys, Wind direction, Washington(State).

Description is given of current meter measurements and STD observations made in Puget Sound in January and February 1973. A level of no net motion at about 50 meters was consistent with data collected in a previous experiment. Near surface currents, temperatures, and salinities were observed to be modified by a change in wind direction.

COM-75-10903/3GA PC$5.25/MF$2.25
National Oceanic and Atmospheric Administration, Honolulu, Hawaii. Joint Tsunami Research Effort.
Multimode Long Surface Waves in Two-Port Basins,
Rudolph W. Preisendorfer. Jan 75, 115p NOAA-JTRE-125 NOAA-75061005
Prepared in cooperation with Hawaii Inst. of Geophysics, Honolulu. Rept. no. HIG-75-4.

Descriptors: *Ocean waves, *River basins, *Surface waves, Water waves, Ocean tides, Tsunamis, Differential equations, Numerical integration.

Two-dimensional time-harmonic surface wave transport problems in rotating, lossy two-port basins are reduced to one-dimensional problems by introducing multi-mode expansions of the fluid wave elevation and volume flux functions. The result is a pair of first order ordinary differential equations for the (Hilbert) vectors whose components are the multimode amplitudes of the elevation and volume flux fields. The solution procedures of these equations can then formally follow those of classic canal theory and are in all respects the proper generalizations of the simpler procedures. In this way many two-dimensional fluid computations can be uniformly handled by one-dimensional, initial-value invariant imbedding procedures which determine the main transport functions for wave amplitude and volume flux, namely, the impedance, admittance, reflectance, and transmittance functions for a given two-port basin.

JPRS-64975 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Ocean Parameters and Carrier Speed,
E. O. Zhilko. 11 Jun 75, 31p
Trans. of Gosudarstvennyi Okeanograficheskii Institut. Trudy (USSR) n117 p5-16, 35-45 1973.

Descriptors: *Sea states, *Wave recorders(Water waves), Radar equipment, Ocean waves, Translations, USSR, Air water interactions.
Identifiers: Ocean surface, Radar reflections.

The report contains the results of comparative measurements of wind-produced sea surface contours using radar methods and a ship wave recorder on the 'Passat' weather ship. It also contains a study of the dependence of the results of sea state parameter measurement on the carrier speed.

N75-23919/4GA PC$4.25/MF$2.25
Battelle Columbus Labs., Ohio.
Bistatic Radar Sea State Monitoring Field Test.
G. T. Ruck, G. K. Kirchbaum, and J. O. Everly. Mar 75, 59p NASA-CR-141394
Contract NAS6-2006

Descriptors: *Bistatic reflectivity, *Radar, *Sea states, Data acquisition, Hardware, Ocean surface, Remote sensors.

For abstract, see STAR 1315

N75-24262/8GA PC$5.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Physics of the Sea and Atmosphere.
A. A. Dmitriyev. May 75, 104p NASA-TT-F-16225
Contract NASW-2483
Tran-Transl. Into English from the Conf. On Phys. Of the Sea and Atmosphere, Moscow, Feb. 1974 p 1-97.

Descriptors: *Elastohydrodynamics, *Heat transfer, *Physical properties, *Sea water, *Upwelling water, *Water waves, Air water interactions, Atmospheric circulation, Dynamic models, Marine biology, Meteorology, Oceanography, Optical properties.

For abstract, see STAR 1315

8E. Geodesy

AD-A011 934/7GA PC$3.75/MF$2.25
Defense Mapping Agency Aerospace Center St Louis Air Force Station Mo
Techniques for the Derivation and Evaluation of Truncated Gravitational Models for Special Applications.
Final rept.,
George T. Stentz, and Haschal L. White. May 75, 35p Rept no. DMAAC-TR-74-001

Descriptors: *Gravitational fields, *Gravity anomalies, Earth models, Truncation, Scientific satellites.
Identifiers: GEOS 1 satellite, GEOS 2 satellite.

In many applications, it is necessary to use a truncated gravitational model because of limitations in computer hardware and software or mission requirements. Consequently, studies have been performed to evaluate the effect of

truncation and also to determine the best method for the derivation of eighth and 12th degree and order gravitational models. Three methods were used for their derivation; truncation by chopping the original more complete model, suppression of parameter corrections for all harmonic coefficients above the desired degree and order, and by not allowing as parameters any gravitational model coefficients above the desired degree and other limitation. The procedures for the derivation and subsequent analysis were applied to both the Department of Defense World Geodetic System 1972 and the 1969 Smithsonian Standard Earth (II) gravitational models.

AD-A011 957/8GA PC$3.75/MF$2.25
Institute for Advanced Study Princeton N J
Geodesic Joins and Frechet Curve Classes,
Dale Landis, and Marston Morse. 11 Nov 74, 27p ARO-6103.26-M
Grant DAHC04-74-G-0163
Summary in Italian.
Availability: Pub. in Rendiconti di Matematica, (1) v8 Ser 6 p161-185 1975.

Descriptors: *Geodesics, *Conformal mapping, Hilbert space, Functions(Mathematics), Reprints.
Identifiers: Frechet curves, Riemannian manifolds.

PB-242 459/6GA PC$4.25/MF$2.25
Geological Survey, Menlo Park, Calif.
Principal Facts, Accuracies, and Sources for 2244 Gravity Stations in the Trona 1 Degree x 2 Degree Sheet, California.
Final rept. 1956-74,
Tor H. Nilsen, and Rodger H. Chapman. 1975, 66p USGS/GD-75/011

Descriptors: *Gravity anomalies, *Gravity corrections, *Gravity reduction, Observed gravity, Reduced gravity, Tables(Data), Statistical data, Gravimeters, California.

Principal facts for 2244 gravity stations in the area covered by the Trona 1 degree x 2 degree Sheet are presented in five separate tables. Descriptions of the format, standards, reduction procedures, and base stations used are also provided. The gravity meters used, calibrations of gravity meters, reduction problems, and accuracies of the data are also discussed. Complete Bouguer anomalies are calculated for each gravity station. The data for each gravity station contain alphanumeric digits that indicate the type of station location relative to elevation determination, accuracy of station elevation, accuracy of latitude or horizontal location and determination, and accuracy of the station's observed gravity value relative to its local base stations. A table providing the code for these digits is included.

8F. Geography

COM-75-10843/1GA PC$3.25
Georgia Univ., Sapelo Island. Marine Inst.
Use of Remote Sensing for Mapping Wetlands,
Robert J. Reimold, and Rick A. Linthurst. 24 Jan 74, 12p NOAA-75061003
Grant NOAA-04-3-158-6
Pub. in Transportation Engineering Jnl. of ASCE, v101 nTE2 p189-198 May 75, Proceedings of the American Society of Civil Engineers, (Proc. paper 11293).

Descriptors: *Swamps, *Estuaries, *Coastal zone management, *Remote sensing, Infrared mapping, Boundaries, Ocean tides, Vegetation, Patterns, Coastal engineering, Land use, Hydrology, Water pollution, Color photography, Intertidal zone.
Identifiers: Reprints, Sea Grant program.

The paper summarizes contemporary remote sensing methodology and its application in wetlands. Using color, color infrared, black-and-white, and black-and-white infrared photography, multiband imagery, and infrared imagery, various applications are examined as they relate to wetlands use. Boundary mapping, vegetation differentiation, and plant primary production patterns have all been demonstrated using remote sensing. A new approach is presented for determination of intertidal water movement using infrared imagery in place of more costly time-consuming dye studies. Remote sensing also has been used in wetlands for location and field orientation, comparative analysis, landform analysis, and water pollution analysis.

COM-75-10858/9GA PC$3.25
Delaware Univ., Newark. Coll. of Marine Studies.
Middle-late Holocene Evolution of the Morphology of a Drowned Estuary System: The Delaware Bay,
John C. Kraft, Robert E. Sheridan, Roger D. Moose, Richard N. Strom, and Charles B. Weil. 1973, 12p DEL-SG-4-75 NOAA-75052003
Contract N00014-69-A-0407, Grant NOAA-04-3-158-30
Presented at the International Symposium on Interrelationships of Estuarine and Continental Shelf Sedimentation, Bordeaux, France, 9-14 Jul 73. Pub. in Memoires de l'Institut de Geologie du Bassin d'Aquitaine, n7 p297-305 1974.

Descriptors: *Estuaries, *Coastal topographic features, *Delaware Bay, Geomorphology, Flooding, Tides, Sands, Shores, Meetings.
Identifiers: Reprints, Sea Grant program.

Seismic and drill evidence has shown that the earlier Holocene estuarine system in the lower part of the present Delaware Bay was much like that of the present middle and upper Delaware estuary. Accordingly, cross sectional profiles and sediment patterns of the present middle and upper estuary may be used as a model for the interpretation of the shape of the estuary, in the area of study, throughout Holocene time. This has made possible the construction of a series of paleogeographic maps of the Delaware estuarine system as it evolved through Holocene time.

E75-10292 PC$5.25/MF$2.25
Maine Dept. of Transportation, Augusta.
Multidisciplinary Analyses of Skylab Photography for Highway Engineering Purposes.
Final rept. Aug 73-Feb 75,
Ernest G. Stoeckeler, Raymond G. Woodman, and Robert S. Farrell. 28 Feb 75, 124p NASA-CR-142836
Contract NAS9-13359
Original contains Color Imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 27198.

Descriptors: Maine, Land use, Hydrology, Vegetation, Geomorphology, Highways, EREP, Skylab program, Multispectral band cameras, Ground truth, Geology, Winter.

The author has identified the following significant results. Fourteen S190A frames and nine S190B frames imaging the state of Maine were received for the multidisciplinary study. Good results were achieved for the hydrology-land use study. Both systems gave better agreement with the ground truth than did LANDSAT imagery. Data derived from S190B photography was found most suitable for developing geologic information.

N75-24064/8GA PC$3.75/MF$2.25
Michigan Univ., Ann Arbor. Radar and Optics Div.
The Application of Airborne Imaging Radars (L and X-Band) to Earth Resources Problems.
Executive Summary Report, 1 Jun. 1973 - 30 Apr. 1974.
B. Drake, R. A. Shuchman, M. L. Bryan, R. W. Larson, and C. L. Liskow. May 74, 38p NASA-CR-139385-1, ERIM-104000-1-F
Contract NAS10-8333

Descriptors: *Earth resources survey aircraft, *Radar imagery, *Radar photography, *Side-looking radar, *Terrain analysis, Aerial photography, Drainage, Ground truth, Infrared imagery, Land use, Vegetation.

For abstract, see STAR 1315

N75-24065/5GA PC$4.75/MF$2.25
Michigan Univ., Ann Arbor. Radar and Optics Div.
The Application of Airborne Imaging Radars (L and X-Band) to Earth Resources Problems.
Detailed Technical Report, 1 Jun. 1973 - 30 Apr. 1974.
B. Drake, M. L. Bryan, C. L. Liskow, R. A. Shuchman, and R. W. Larson. May 74, 83p NASA-CR-139385-2, ERIM-104000-1-F
Contract NAS10-8333

Descriptors: *Earth resources survey aircraft, *Radar imagery, *Radar photography, *Terrain analysis, Aerial photography, Drainage, Ground truth, Infrared imagery, Land use, Vegetation.

For abstract, see STAR 1315

N75-24546/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Regional Environmental Analysis and Management: New Techniques for Current Problems.
R. B. Honea, and C. T. N. Paludan. 1974, 10p NASA-TM-X-66813, CONF-741216-1
Subm-Sponsored by NSF and Erda. Conf-Presented at the Intern. Geol. Union Regional Conf., Palmerston North, New Zealand, 4-11 Dec. 1974.

Descriptors: *Computer techniques, *Environment management, *Regional planning, Data acquisition, Data processing, Landsat satellites.

For abstract, see STAR 1315

8G. Geology and Mineralogy

AD-A011 701/0GA PC$3.25/MF$2.25
State Univ of New York At Stony Brook Dept of Earth and Space Sciences
Origin of Plastic Deformation in Olivine and Pyroxene.
Scientific interim rept.,
Derek Morrison-Smith, Neville Carter, and Charles Prewitt. 1 Sep 74, 11p Rept no. Scientific-1 AFCRL-TR-74-0487
Contract F19628-73-C-0037

Descriptors: *Crystal structure, *Plastic deformation, Silicates, Minerals, Electron microscopy, Dislocations, Crystal defects, High temperature, Strain rate, X ray diffraction.
Identifiers: Slip(Crystallography), *Olivine, *Pyroxene.

This report describes work initiated under the Contract in which it was proposed to study the slip systems in olivine and pyroxenes using electron microscopy, determine the high temperature crystal structures of these minerals and with this data model the motion of dislocations through these structures. Using this approach it is hoped to be able to predict which slip systems will predominate under particular temperature and strain rate conditions.

AD-A011 740/8GA PC$3.25/MF$2.25
California Inst of Tech Pasadena Hydrodynamics Lab
Isostatic Recovery and the Strain Rate Dependent Viscosity of the Earth's Mantle,
Christopher Brennen. 6 Dec 73, 10p Rept no. E-97A-37
Contract N00014-67-A-0094-0012, Grant NSF-GI-38718X
Availability: Pub. in Jnl. of Geophysical Research, v79 n26 p3993-4001, 10 Sep 74.

Descriptors: *Geophysics, *Earth mantle, Viscous flow, Variations, Depth, Relaxation time, Rheology, Strain rate, Viscosity, Reprints.
Identifiers: Isostatic recovery.

This paper is concerned with the interpretation of isostatic recovery data terms of the flow properties of the earth's mantle. A hydrodynamic analysis is first presented that allows straightforward calculation of the relaxation time for isostatic recovery within a mantle in which the viscosity varies continuously with depth. However, it transpires that no curve of this type (i.e., choice of a reference viscosity and a rate of change of viscosity with depth) can of itself adequately explain the available observational data from the Fennoscandian and Laurentide ice sheets and the pluvial Lake Bonneville. (Author)

AD-A012 047/7GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa
Bulk Density-Water Content Relationship in Marine Silts and Clays,
Adrian F. Richards, Terrence J. Hirst, and James M. Parks. 6 Feb 74, 8p
Contract N00014-67-A-0370-0005, Grant C-1-35357
Availability: Pub. in Jnl. of Sedimentary Petrology, v44 n4 p1004-1009 Dec 74.

Descriptors: *Silt, *Clay, *Density, *Sea water, *Sediments, Sedimentology, Marine geology, Reprints.

Several methods of bulk density and water content measurement by conventional destructive and nuclear nondestructive techniques have been discussed. Computed-generated relationships between bulk density, water content and void ratio have been developed that are based on 1680 bulk density-water content measurements performed on seafloor sediments. An approximate method of calculating specific gavity is derived that will be of use to both geologists and engineers involved in extensive laboratory studies of saturated sediments. As noted earlier, water content as defined in this paper is pure water content, with no correction having been made for dissolved salt content. Until a universally acceptable method of correcting measured water content for dissolved salt is adopted, we believe it is preferable to express the relationships in the manner presented. If and when a standard correction method is adopted, only a very simple recalculation of the equations will be required. The usefulness of the presented relationships is demonstrated for consolidation studies on saturated sediments. Sedimentation-compression diagrams can be directly constructed from nondestructive nuclear transmission densitometer data. (Author)

AD-A012 048/5GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Marine Geotechnical Lab
Geotechnical Properties of the Golfo San Matias, Argentina,
Adrian F. Richards, and Peter T. Dzwilewski. 8 Feb 74, 8p
Contracts Nonr-3985(09), N00014-67-A-0370-0005
Availability: Pub. in Jnl. of Sedimentary Petrology, v44 n3 p649-654 Sep 74.

Descriptors: *Ocean bottom soils, Gulfs, Sedimentation, Silt, Clay, Argentina, Cores, Cavities, Compressive properties, Thickness, Basins(Geographic), Filling, Reprints.

Two 1.3 m gravity cores of cohesive clayey silt with very high plasticity were raised from the north and south parts of the deep basin in Golfo San Matias, a gulf located about 900 km southwest of Buenos Aires, Argentina. Rivers do not flow into this gulf, which has a maximum water depth of about 194 m. Movement of water between the gulf and the adjacent ocean is restricted by a sill at a depth of 60-66 m. Sediment grain-size averaged 47% clay, 50% silt, and 3% sand; montmorillonite is the predominant clay mineral. Water content ranged from 211% dry weight at the surface to 163% at the bottom of the cores, and averaged 186%. Liquid and plastic limits averaged 130% and 55%, respectively. Bulk density varied from 1.26 to 1.32 Mg/cu m. Consolidation behavior, shown by sedimentation-compression curves, is unusual because the void ratio remained relatively constant at a value of about 5 with respect to increasing effective over-burden pressure. From one laboratory consolidation test the compression index was about 2.4. The over consolidation ratio was computed to be 2.3, which is usual for a small burial depth. The distribution of the isobaths indicate probable movement of sediments originating from the Rio Negro or the Rio Colorado from west to east into the basin, which may be filling rapidly.

AD-A012 050/1GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Marine Geotechnical Lab
Theory of Nuclear Transmission Densitometry Applied to Sedimentology and Geotechnology,
Peter V. Meyers, Wesley J. Van Sciver, and Adrian F. Richards. 1974, 8p
Contract N00014-67-A-0370-0005
Availability: Pub. in Jnl. of Sedimentary Petrology, v44 n4 p1010-1015 Dec 74.

Descriptors: *Sedimentology, *Sediments, Moisture, Determination, Density, Marine geology, Gamma rays, Attenuation, Cores, Bulk materials, Ocean bottom soils, Grain size, Water, Gamma ray scattering, Reprints.
Identifiers: Moisture content, Bulk density.

A method of taking into account the changes in water content along the length of marine sediment cores analyzed by gamma ray attenuation is presented. Using previously established formulas, it is possible to choose calibration coefficients that will result in an error of less than 17 kg/cu m for the bulk density of most marine sediments while eliminating the task of estimating the water content of the sediment. Errors in bulk density due to errors in estimates of the chemical composition and grain density of the sediment are discussed.

AD-A012 051/9GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Marine Geotechnical Lab
Comparison of Sedimentation-Compression Curves Obtained by Nuclear and Gravimetric Methods for Wilkinson Basin, Gulf of Maine, Sediments,
Sung Kwun Chough, and Adrian F. Richards. 31 Jan 74, 14p
Contract N00014-67-A-0370-0005
Availability: Pub. in Marine Geology, 17 p249-261 1974.

Descriptors: *Sediments, *Sedimentation, *Maine gulf, *Density, *Measurement, Compression, Water, Densitometers, Radiation measuring instruments, Gravimetric analysis, Sea water, Reprints.

Accurate measurements of bulk density are important in the construction of sedimentation-compression curves of water-saturated, fine-grained cohesive sediments for consolidation studies. The bulk density of five cores was measured nondestructively on a laboratory nuclear transmission densitometer and the water content, expressed as void ratio, was derived from an empirical relationship between bulk density and water content. 9 Bulk density and water content measured destructively was determined every 10 cm for a comparison with the nuclear data. Agreement between nuclear and gravimetric methods was within + or -0.02 g/cc for bulk density ranging from 1.2 to 1.4 g/cc. Sedimentation compression curves made using both methods were in generally good agreement. In the Wilkinson Basin, void ratio gradually decreases with increasing effective overburden pressure. This indicates that consolidation by dewatering the surficial sediments is normal and that the environmental conditions during deposition remained relatively constant. (Author)

AD-A012 140/0GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
An Analytical Study of Projectile Penetration into Rock.
Final rept.,
Dwain K. Butler. Jun 75, 91p Rept no. AEWES-TR-S-75-7
Sponsored in part by Defense Nuclear Agency, Washington, D.C.

Descriptors: *Rock, *Projectiles, *Penetration, Rock mechanics, Impact, Density, Field tests.

This report presents the results of a parameter study of projectile pentration into rock using a computer code based on U.S. Army Engineer Waterways Experiment Station modifications and extensions of the Ross-Hanagud pentration theory, which in turn is based on the dynamic cavity expansion theory of Goodier. The theory treats the projectile as a rigid body and the target as an elastic-plastic locking material. The objectives were to gain (1) a qualitative and quantitative understanding of the factors of importance in rock penetration, (2) a feel for the depths of penetration which may be attainable, and (3) an appreciation for the complexities and uncertainties involved. Such an understanding is essential for the design of penetrating weapons for use against targets in rock or in situations in which, because of incomplete target intelligence, the possibility of encountering rock cannot be eliminated.

AD-A012 182/2GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Hornblende Deformation Features,
Thomas P. Rooney, Robert E. Riecker, and Anna T. Gavasci. 6 Mar 75, 5p Rept no. AFCRL-TR-75-0352
Availability: Pub. in Geology, v3 n7 p364-366 Jul 75.

Descriptors: *Rock forming minerals, *Plastic deformation, Synthetic stones, Mountains, Twinning(Crystallography), Single crystals, Deformation, Reprints.
Identifiers: *Hornblende.

E75-10291 PC$7.00/MF$2.25
Rockwell International Corp., Thousand Oaks, Calif. Science Center.
Identification and Interpretation of Tectonic Features from ERTS-1 Imagery Southwestern North America and the Red Sea Area.
Final rept. 30 May 72-11 Feb 75,
Monem Abdel-Gawad, and Linda Tubbesing. 5 May 75, 190p SC543.16FR NASA-CR-142835
Contract NAS5-21767
Original contains imagery. Original photography may be purchased from the EROS Data

Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: California, Mexico, Sierra Nevada Mountains(CA), Great Basin(US), Gulf of California(Mexico), Red Sea, Geological faults, Texas, Saudi Arabia, African rift system, Earth resources program, Earthquakes, Seismic waves, Tectonics.

The author has identified the following significant results. The ERTS-1 imagery was utilized to study major fault and tectonic lines and their intersections in southwestern North America. A system of transverse shear faults was recognized in the California Coast Ranges, the Sierra Nevada, the Great Basin, and Mexico. They are interpreted as expressions of a major left-lateral shear which predated the San Andreas system, the opening of the Gulf of California and Basin and Range rift development. Tectonic models for Basin and Range, Coast Ranges, and Texas-Parras shears were developed. Geological structures and Precambrian metamorphic trend lines of schistosity were studied across the Red Sea rift.

8H. Hydrology and Limnology

COM-75-10895/1GA PC$3.75/MF$2.25
National Oceanic and Atmospheric Administration, Ann Arbor, Mich. Great Lakes Environmental Research Lab.
Lake Michigan Beginning-of-Month Water Levels and Monthly Rates of Change of Storage.
Technical rept.,
Frank H. Quinn. Mar 75, 38p GLERL-2, GLERL-Contrib-21 NOAA-75061206, NOAA-TR-ERL-326
Paper copy also available from GPO as C55.13:ERL 326-GLERL-2.

Descriptors: *Lake Michigan, *Water storage, Tables(Data), Seasonal variations, Water loss, Evaporation, Measuring instruments, Networks.
Identifiers: *Water levels.

The report describes the results of a study of Lake Michigan beginning-of-month water levels and monthly changes of storage. The study established that the number and distribution of water level gages in the presently existing gage network is adequate for the computation of beginning-of-month water levels. Computed beginning-of-month water levels and changes of storage for the period 1900-1972 are listed for use in scientific and planning studies.

N75-24067/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Environmental Aspects of Run-off and Siltation in the Anacostia Basin from Hyperaltitude Photographs.
C. D. Ealy, R. F. Mueller, and J. R. Weider. Nov 73, 49p NASA-TM-X-70888, X-644-73-352

Descriptors: *Environment effects, *Maryland, *River basins, *Urban development, *Water runoff, Aerial photography, Drainage, Highways, Land management, Sediment transport, Soil erosion, Water pollution.

For abstract, see STAR 1315

N75-24068/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Broadband Spectral Photography of the James River.
W. E. Bressette. Apr 75, 25p NASA-TM-X-72689

Descriptors: *Aerial photography, *Multispectral photography, *Rivers, Color photography, Optical filters, Photomapping, Remote sensors.

For abstract, see STAR 1315

N75-24070/5GA PC$4.75/MF$2.25
Louisiana State Univ., Baton Rouge. Dept. of Chemical Engineering.
Development of a Three-Dimensional Time-Dependent Flow Field Model.
R. C. Farmer, W. R. Waldrop, F. H. Pitts, and K. R. Shah. Jan 75, 95p NASA-CR-120762
Contract NAS8-30380

Descriptors: *Flow distribution, *Mathematical models, *Three dimensional flow, Computer programs, Estuaries, Oceanography.

For abstract, see STAR 1315

N75-24072/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Applications of Remote Sensing to Watershed Management.
A. Rango. Apr 75, 20p NASA-TM-X-70896, X-913-75-86
Subm-Submitted for Publication. Conf-Presented for Presentation at Symp. On Watershed Management, AM. Soc. Of Civil Engr., Logan, Utah, 11-13 Aug. 1975.

Descriptors: *Management methods, *Remote sensors, *Watersheds, Aerial photography, Multispectral band scanners, Technology utilization.

For abstract, see STAR 1315

PB-242 336/6GA PC$3.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
An Approach to a Relative Trophic Index for Classifying Lakes and Reservoirs (A Preliminary Analysis of National Eutrophication Survey Data Collected During the 1972 Sampling Period).
Preliminary rept.
Dec 74, 47p Working Paper-24

Descriptors: *Lakes, *Reservoirs, *Limnology, *Water quality, Classifications, Surveys, Indexes(Documentation), Tables(Data).
Identifiers: *Trophic level, Eutrophication, Oligotrophy, Mesotrophy, Eutrophy.

A relative trophic state index for lake classification was developed using six key water quality parameters. The data base was approximately 200 lakes and reservoirs in northeast and north central United States which had been included in the National Eutrophication Survey during 1972-73. Each lake was given an index number and was also classified according to the conventional terminology of oligotrophic, mesotrophic, and eutrophic. The method can be used to classify a lake of unknown trophic condition if the proper parameters have been measured.

PB-242 509/8GA PC$5.75/MF$2.25
Wisconsin Univ., Madison. Water Resources Center.
Exchangeable Inorganic Phosphate in Lake Sediments.
Doctoral thesis,
Wan Chi Li. 1973, 137p W75-08577, OWRT-B-022-WIS(10)
DI-14-01-0001-1961

Descriptors: *Water quality, *Sediments, *Inorganic phosphates, *Lakes, Water chemistry, Aquatic plants, Nutrients, Exchange reactions, Correlation techniques, Chemical equilibrium, Aerobic processes, Anaerobic processes, Water analysis, Sources, Availability, Theses, Wisconsin.
Identifiers: Myriophyllum spicatum.

The quantity of available P in selected sediments was evaluated by measurement of the amounts of P removed from sediments by Myriophyllum spicatum L. grown in columns containing sediment as the sole P source and amended with other essential nutrients. The relationships between the amount of sediment inorganic P added, the yield and P content of the plants, and the uptake of sediment inorganic P were evaluated. Available P comprised from 12.3 to 17.2% of total sediment inorganic P for the eight lake sediments investigated. Relationships between P uptake by Myriophyllum plants (micrograms phosphorus/gram of sediment) and the total inorganic phosphate, nonoccluded inorganic phosphate and total exchangeable inorganic phosphate contents of sediments were evaluated.

8I. Mining Engineering

COM-75-10714/4GA PC$4.75/MF$2.25
New Hampshire Univ., Durham. Center for Industrial and Institutional Development.
A Study to Understand the Environmental and Ecological Impact of Marine Sand and Gravel Mining in Order to Prepare Guidelines for Mining Operations in the Sea -- Chemical Characterization of Core Samples from the Dredge Site.
Final rept. 1 Jul 72-30 Jun 73,
C. L. Grant, R. J. Downer, J. P. Nielsen, R. E. Keegan, and E. L. Hagmann. Dec 74, 91p NOAA-75050904
Grant NOAA-03-3-022-43
New England Offshore Mining Environmental Study (NOMES).

Descriptors: *Sands, *Gravel, *Undersea mineral deposits, *Dredging, Sediments, Chemical analysis, Trace elements, Water analysis, Spoil, Ocean bottom, Sampling, Water pollution, Mining, Marine geology, Ocean environments, Pesticides.
Identifiers: Dredge spoil, *Water pollution detection, Marine ecology, *Underwater mining.

The chemical analysis of marine bottom sediments provides valuable information concerning the composition of the sediments themselves as well as the effects of sediments on the overlying water mass and the biological systems which exist at the sediment-water interface. This report's investigations have shown that the dredge spoils are unlikely to induce significant trace metal contamination to the surface water by a desorption mechanism. Consequently, the major source of trace metal additions to the water will be the dredge apparatus and associated activities.

COM-75-10717/7GA PC$5.25/MF$2.25
Rhode Island Univ., Kingston. Dept. of Resource Economics.
Offshore Petroleum and New England - A Study of the Regional Economic Consequences of Potential Offshore Oil and Gas Development,
Thomas A. Grigalunas. 1975, 123p* Marine-TR-39 NOAA-75051603
Grant NOAA-04-3-158-3
Also pub. as Rhode Island Agricultural Experiment Station, Contrib-1604.

Descriptors: *Offshore drilling, *Oil recovery, *Petroleum industry, *New England, Crude oil, Natural gas, Petroleum refining, Economics, Economic impact, Regional economic models, Economic analysis, Georges Bank.
Identifiers: Sea Grant program.

This report examines the direct and secondary impacts on New England of alternative potential offshore oil and gas developments and

possible petroleum refinery activity within the region. A number of specific Georges Bank oil and gas and petroleum refinery scenarios are postulated. For each alternative set of developments, estimates are made of their effects on total earnings, income, employment, and other socio-economic indicators. An estimate is provided of the possible direct and secondary impacts of alternative petroleum developments on broad industrial sectors of the regional economy.

JPRS-64749 PC$4.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Means of Automation of Mine Ventilation,
I. M. Mester, and I. N. Zasukhin. 13 May 75, 77p
Trans. of mono. Avtomatizatsiya Kontrolya i Regulirovaniya Rudnichnogo Provetrivaniya, Moscow, 1974 p139-211.

Descriptors: *Mine ventilation, Automation, Monitors, Control, Air circulation, Air flow, Translations, USSR.

The report contains a solution to the problem of the automation of mine ventilation monitoring and regulation.

PB-242 374/7GA PC$6.25/MF$2.25
Foster-Miller Associates, Inc., Waltham, Mass.
Coal Mine Escape Hoist Standards.
Final rept.,
D. Randolph Berry, David Hoadley, Donald Kingery, and John Potter. 12 Dec 74, 166p
BuMines-OFR-42-75
Contract H0133020

Descriptors: *Hoists, *Safety, Mine hoisting, Standards, Escape systems, Coal mines, Design, Wire rope.
Identifiers: Mine safety.

As a result of the surveys, interviews, and research performed on this contract, the following conclusions are drawn: (1) Most present emergency escape installations are inadequate and some are either inoperative or unsafe; (2) the MESA Districts have different local needs and impressions of what is necessary to ensure compliance. No guidelines up to the present have been effective and widely enforced; (3) there is equipment available at present which can be used to design and build safe and economic emergency hoists; (4) the guidelines proposed as a result of this contract are intended to permit mine operators to select an economic and safe hoisting system, and to provide the district managers, MESA, with the information needed to guarantee that only safe and operational systems are approved; (5) the escape hoist design developed demonstrates an acceptable hoisting system, suitable for use at over 90% of the installations investigated, and in full compliance with the proposed guidelines.

PB-242 465/3GA PC$8.50/MF$2.25
Pennsylvania Dept. of Environmental Resources, Harrisburg.
State of the Art of Subsidence Control.
Final rept.,
R. E. Gray, J. C. Gamble, R. J. McLaren, and D. J. Rogers. Dec 74, 273p* ARC-73-111-2550
Grant ARC-73-111/ARK-2550
Prepared by General Analytics, Inc., Monroeville, Pa.

Descriptors: *Subsidence, *Coal mines, *Soil stabilization, Reviews, Control, Mines(Excavations), Underground supporting, Surfaces, Abandonment, Mining engineering, Settlement(Structural), Stabilization, Underground mining.

Methods of controlling or preventing surface subsidence damage above active and abandoned mines (particularly coal) are described. For abandoned mines, selective support methods, such as grout columns, deep foundations and piers; and filling methods, such as hydraulic flushing, pneumatic filling, fly ash injection, grouting, blasting and overexcavation are described and approximate costs presented. Techniques to evaluate subsidence potential are included. For active mines, principles of subsidence development above tabular deposits are discussed, including a review of research studies and predictive methods. Subsidence control, by cancelling or selectively positioning surface strains, and subsidence prevention by subsurface support are described with examples. Annotated bibliographies are included.

PB-242 467/9GA PC$10.50/MF$2.25
Pennsylvania Dept. of Environmental Resources, Harrisburg.
Relationship Between Underground Mine Water Pools and Subsidence in the Northeastern Pennsylvania Anthracite Fields.
Final rept. 25 Sep 73-30 Apr 75,
William W. Beck, Jr., Arthur L. Russnow, and Grover H. Emrich. 30 Apr 75, 411p* ARC-73-111-2553
Prepared by Martin (A. W.) Associates, Inc., King of Prussia, Pa.

Descriptors: *Subsidence, *Mine waters, *Coal mines, Underground mining, Coal deposits, Pennsylvania, Geology, Ground water, Control, Storms, Tropical cyclones.
Identifiers: Tropical storm Agnes.

The study is part of a comprehensive program related to the land subsidence that occurred in the anthracite region of northeastern Pennsylvania in response to Tropical Storm Agnes. The objectives of this study were (1) to determine the mine pool factors that contribute to or influence subsidence, (2) to define and document present mine pool conditions in the anthracite fields of northeastern Pennsylvania, and (3) to recommend the most effective and feasible methods of controlling the mine pools to reduce or prevent future subsidences. The findings of this investigation were (1) peak precipitation precedes subsidence 87% of the time; (2) subsidence occurs in areas where roof rock conditions are poor or where abnormally high hydrostatic pressure occurs in structurally weak areas; (3) subsidence occurs along outcrop areas and where a high percentage of coal has been removed; (4) subsidence occurred during Tropical Storm Agnes where high hydrostatic pressure developed.

PB-242 468/7GA PC$7.50/MF$2.25
Pennsylvania Dept. of Environmental Resources, Harrisburg.
Use of Photo Interpretation and Geological Data in the Identification of Surface Damage and Subsidence.
Final rept. Nov 73-Apr 75.
Apr 75, 246p* ARC-73-111-2554
Prepared by Earth Satellite Corp., Washington, D.C.

Descriptors: *Subsidence, *Remote sensing, *Photogeology, Mines(Excavations), Coal mining, Surfaces, Fracture zones, Coal deposits, Underground mining, Mine waters, Aerial photography, Aerial surveys, Side looking radar, Scientific satellites, Data acquisition, Pennsylvania.

Mulit-sensor, multi-level remote sensing was examined for utility in detecting and delineating the surface expression of mine subsidence in the Northern Anthracite Coal Field of Pennsylvania. The objectives were to determine not only those sensors and analysis techniques which offer the best results in the identification of mine subsidence, but to identify areas of potential subsidence so they can be considered in future planning and zoning processes. In this evaluation a variety of data were examined including ERTS imagery, SLAR imagery, color and color infrared photography of a number of scales, panchromatic photography acquired during the last 30 years, and spectro radiometric and thermal infrared scanner data. Maps were prepared showing geological lineaments which could be areas of structural weakness and which could act as avenues of water circulation into mines. Maps showing identified areas of mine subsidence were also produced.

PB-242 580/9GA PC$10.00/MF$2.25
Berger Associates, Harrisburg, Pa.
Evaluation of Mining Constraints to the Revitalization of Pennsylvania Anthracite.
Open file rept.
Mar 75, 375p BuMines-OFR-47-75
Contract S0241039
Prepared in cooperation with Reidel (A. B.) Associates, Harrisburg, Pa.

Descriptors: *Coal, *Coal mining, *Anthracite, *Pennsylvania, Reserves, Economic development, Constraints, Economic geology, Mining equipment, Geography, Manpower, Transportation, Government policies, Legislation, Marketing, Economic analysis, Mine wastes, Drainage, Pumping.
Identifiers: Coal mine refuse.

The objective of this research was to evaluate the technical and economic constraints on the extraction and utilization of anthracite coal and to determine the research and development needed in order to make anthracite coal more fully used as a premium energy resource. The report examines in detail the anthracite industry both past and present and evaluates market possibilities. Anthracite reserves and resources are analyzed and tabulated, and the problem of pumping and drainage from the flooded anthracite fields is covered. Current technology is considered in detail with a discussion of production techniques with potential for improvement. The contractor concludes the report with a summary of constraints on the anthracite industry and the contractor's recommendations for effecting a revitalization of that industry. An estimated production of 17 million tons annually by 1990 can be anticipated if adequate planning, research, and development to overcome present constraints are initiated in the near future.

PB-242 623/7GA PC$3.75/MF$2.25
Bureau of Mines, San Francisco, Calif. San Francisco Energy Research Lab.
Source of Solids in Injection Waters, Wilmington Field, California.
Rept. of investigations,
G. L. Gates, W. H. Caraway, and H. J. Lechtenberg. May 75, 30p BuMines-RI-8031

Descriptors: *Suspended sediments, *Water injection, *Oil recovery, Silica, Chemical composition, Clays, Iron sulfides, Barium sulfates, Feedwater treatment, Calcium carbonate, Solubility, California.
Identifiers: Water pollution control.

The waters used to waterflood the Wilmington oilfield were studied. Increases in the pressure of the injection wells indicated that they were being plugged by materials suspended in the waters. This study was made to identify the suspended materials, determine their origin, and find methods of preventing their formation. The suspended oil-coated materials were iron sulfide, barium sulfate, calcium carbonate, clay, and sand (or silica). The solubility of iron sulfide and calcium orthophosphate in the injection waters was also determined.

PB-242 624/5GA PC$3.75/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.

Optical Detection of Fires and Explosions. An Infrared System for Methane-Air Ignitions.
Rept. of investigations,
Martin Hertzberg, and Charles D. Litton. May 75, 29p BuMines-RI-8035

Descriptors: *Coal mining, *Mine fires, Optical detection, Infrared detection, Ultraviolet detection, Infrared detectors, Underground explosions, Methane, Design, Performance tests, Safety engineering.
Identifiers: Mine safety.

The optical detection of fires and explosions is considered fundamentally. The measured spectral radiances from methane-air ignitions are compared with the background irradiances from stray and ambient sources, and with the spectral sensitivities of various sensors. The comparison naturally suggests the optimum spectral ranges and signal processing logic that can uniquely characterize the ignition event. Both ultraviolet and infrared systems are considered. Several alternate sensing methods are proposed and discussed. The development and testing of an infrared system designed for use in ignition suppression devices in mines is described.

PB-242 651/8GA PC$5.25/MF$2.25
Mathematica, Inc., Princeton, N.J.
Design of Surface Mining Systems in Eastern Kentucky. Task 1. Research and Demonstration of Improved Surface Mining Systems in Eastern Kentucky Coal Fields. Volume I. Summary.
Final rept. May 72-Aug 73.
Jan 74, 108p ARC-71-66/T1-Vol-1
Prepared in cooperation with Ford, Bacon and Davis, Inc., New York, and Kentucky Dept. of Natural Resources and Environmental Protection, Frankfort.

Descriptors: *Coal mining, *Strip mining, *Surface mining, *Kentucky, Mining research, Mining equipment, Management planning, Economic analysis, Water resources, Government policies, Regulations, Landslides, Sedimentation, Water pollution, Vegetation, Esthetics, Cost estimates, Mine wastes, Assessments.
Identifiers: Environmental impacts, Coal refuse banks.

Between May 1972 and August 1973 this study of the economics, engineering, and environmental impacts of Eastern Kentucky surface coal mining was conducted for Kentucky's Department of Natural Resources and Environmental Protection. The broad objectives of the study were (1) to identify modified mining technologies (equipments and methods) whose estimated economic and environmental characteristics were such that further research and field demonstration of the methods was warranted, and (2) to identify feasible and desirable modifications in the policies and procedures used in regulation of the industry by the Kentucky Division of Reclamation.

PB-242 652/6GA PC$10.50/MF$2.25
Mathematica, Inc., Princeton, N.J.
Design of Surface Mining Systems in the Eastern Kentucky Coal Fields. Part One. Research and Demonstration of Improved Surface Mining Techniques. Volume II.
Final rept. May 72-Aug 73.
29 Jan 74, 401p ARC-71-66/T1-Vol-2
Prepared in cooperation with Ford, Bacon and Davis, Inc., New York, and Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort.

Descriptors: *Coal mining, *Strip mining, *Surface mining, *Kentucky, Mining research, Mining equipment, Management planning, Mine wastes, Economic analysis.

Contents:
Existing methods for surface mining of coal in Eastern Kentucky;
Criteria and assumptions used in developing alternative mining technologies;
Results of survey of existing technologies;
Descriptions of modified mining technologies;
The economics of existing and modified technologies;
Administrative and control procedures;
Pilot demonstrations of modified technologies.

PB-242 653/4GA PC$8.50/MF$2.25
Mathematica, Inc., Princeton, N.J.
Design of Surface Mining Systems in the Eastern Kentucky Coal Fields. Part One. Research and Demonstration of Improved Surface Mining Techniques. Volume III.
Final rept. May 72-Aug 73.
29 Jan 74, 239p ARC-71-66/T1-Vol-3
Prepared in cooperation with Ford, Bacon and Davis, Inc., New York, and Kentucky Dept. for Natural Resources and Environmental Protection, Frankfort.

Descriptors: *Coal mining, *Strip mining, *Surface mining, *Kentucky, Mining research, Reserves, Supply(Economics), Classification, Tables(Data), Water quality, Computer programs, Questionnaires, Regional planning, Mine waters.

Contents:
East Kentucky surface coal production for calendar year 1971;
Classification of counties, companies, and mines by size;
Questionnaire used in Fall 1972 field survey of Eastern Kentucky surface coal mines;
An economic model of conventional contour/auger strip mining;
Sampling plan for Fall 1972 field survey of Eastern Kentucky surface mines;
1971 East Kentucky surface coal production by coal seam;
Water quality analysis for samples taken at Eastern Kentucky surface coal mines visited during the Fall 1972 field survey;
Illustrative cost calculations.

PB-242 749/0GA PC$5.25/MF$2.25
Bureau of Mines, Denver, Colo. Denver Mining Research Center.
Estimating Direct Costs of Development in a Block Caving Mine.
Information circular,
Nils A. Eilertsen. May 75, 116p BuMines-IC-8673

Descriptors: *Caving mining, *Mineral economics, *Mineral deposits, Economic analysis, Labor estimates, Fixed investment, Construction costs, Structural forms, Structural members, Supervision.

This report describes the unit cost procedure for estimating direct development costs within a cave block in an undercut block caving mine. Costs of supervision, labor, equipment, and supplies are combined to build a unit cost for each type and size of mine development opening in the block. These costs are then combined to estimate the direct cost for developing a ton of ore. Operating data from several domestic metal mines is combined with a hypothetical mining system to illustrate the costing procedure.

8J. Physical Oceanography

AD-A011 744/0GA PC$3.25/MF$2.25
Scripps Institution of Oceanography La Jolla Calif
The Influence of Longitudinal Variations in Wind Stress Curl on the Steady Ocean Circulation,
Kern E. Kenyon. 2 Sep 74, 17p Rept no. IDOE75-404
Contract N00014-75-C-0260
Availability: Pub. in Jnl. of Physical Oceanography, v5 n2 p334-346 Apr 75.

Descriptors: *Wind, *Ocean waves, *Ocean currents, Ocean models, Oceans, Circulation, Interactions, Stresses, Variations, Reprints.
Identifiers: Wind stress curls.

The influence of longitudinal variations in wind stress curl on the steady circulation in a rectangular ocean basin is investigated analytically in a linear barotropic model. It is shown that longitudinal variations in the interior circulation are produced by longitudinal variations in the magnitude of a wind stress curl of constant (negative) sign. (Author)

AD-A011 818/2GA PC$3.75/MF$2.25
Environmental Prediction Research Facility (Navy) Monterey Calif
Classification and Analysis/Forecasting of Near-Surface Ocean Thermal Structure.
Technical paper,
T. Laevastu. May 75, 35p Rept no. ENVPREDRSCHF-tech paper-14-75

Descriptors: *Ocean surface, *Thermoclines, Weather forecasting, Thermal properties, Bathythermograph data, Depth, Flow charting, Deep water, Upwelling, Predictions, Classification, Temperature gradients, North Atlantic Ocean.

The near-surface ocean thermal structure (surface to ca 400 m) is classified into nine distinct types. The time and space distribution of these types is briefly discussed. A rational method for analysis/prediction of mixed layer depth (MLD) and near-surface thermal structure, which has produced satisfactorily verifiable results, is described and flow diagrams for it are given.

AD-A011 880/2GA PC$3.75/MF$2.25
Washington Univ Seattle Dept of Oceanography
A Compilation of Articles Reporting Research Sponsored by the Office of Naval Research.
May 75, 51p Rept nos. TR-331, Ref-M75-56
Contracts N00014-67-A-0103-0014, Nonr-477(37)
Includes Rept. nos. TR-332 three TR-336. See also AD-A011 887.
Availability: Pub. in Various Jnls.

Descriptors: *Oceanography, Sea water, Salinity, Signal processing, Marine biology, Arctic Ocean, Silicates, Phosphorus, Circulation, Transport properties, Nitrogen, Ocean tides, Seamounts, Hydrostatic pressure, Plankton, Hydrostatic pressure, Plankton, Aquatic plants, Aquatic animals, Phosphorus compounds, Precipitation, Reprints.
Identifiers: Silicoflagellates, Ebridians, Phosphorite, Cobb seamount, Flagellates, Nutrients, Denitrification.

Electronic Digitalization and Sensor Response Effects on Salinity Computation from CTD Field Measurements; Silicoflagellates and Ebridians from Leg 31 of the Deep Sea Drilling Project; Nutrient Transport through Lancaster Sound in Relation to the Arctic Oceans's Reactive Silicate Budget and the Outflow of Bering Strait Waters; Marine Phosphorite Deposits and the Nitrogen Cycle; Tides at Cobb Seamount; and The Effect of Hydrostatic Pressure on Respiratory Electron Transport System Activity in Marine Zooplankton.

AD-A011 881/0GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Electronic Digitization and Sensor Response Effects on Salinity Computation from CTD Field Measurements.
Technical rept.,
Gunnar I. Roden, and James D. Irish. 20 Jun 74, 5p Rept nos. TR-331, Contrib-788

Contract N00014-67-A-0103-0014
Availability: Pub. in Jnl. of Physical Oceanography, v5 n1 p195-199 Jan 75.

Descriptors: *Salinity, *Oceanographic data, Sampling, Depth finding, Thermoclines, Electrical conductivity, Profiles, North Pacific ocean, Reprints.

Spikes are often observed in salinity profiles computed from measurements of conductivity, temperature and pressure. Many of these spikes are not real and are the result of a mismatch in the response functions of the sensors. Some of the spikes are also due to the sequential sampling technique used by most digitizers whereby the sensors are not sampled at the same time or position. We derive expressions to linearly correct for these two causes of spikes. When the corrections are applied to measurements in the North Pacific, a significant reduction in the number and size of the spikes is observed in high gradient regions such as the thermocline. (Author)

AD-A011 884/4GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
Marine Phosphorite Deposits and the Nitrogen Cycle.
Technical rept.,
D. Z. Piper, and L. A. Codispoti. 1975, 4p Rept nos. TR-334, Contrib-835
Contract N00014-67-A-0103-0014
Availability: Pub. in American Association for the Advancement of Science, v188 p15-18, 4 Apr 75.

Descriptors: *Sea water, *Chemical oceanography, Phosphorus, Nitrogen, Concentration(Composition), Oceans, Precipitates, Marine geology, Reprints.

AD-A011 887/7GA PC$4.25/MF$2.25
Washington Univ Seattle Dept of Oceanography
A Compilation of Articles Reporting Research Sponsored by the Office of Naval Research.
Jun 75, 70p Rept nos. TR-343, Ref-M75-66
Contracts N00014-A-0103-0014, Nonr-477(37)
Includes Rept. nos. TR-344 thru TR-346. See also AD-A011 880.
Availability: Pub. in Various Jnls.

Descriptors: *Oceanography, *Internal waves, Ocean waves, Oceanographic data, Continental slopes, Ocean tides, Ocean models, Plankton, Respiration, Sea water, Temperature, Metabolism, Marine geophysics, Reprints.
Identifiers: California current.

Contents: Effects of Continental Slope and Variable Brunt-Vaisala Frequency on the Coastal Generation of Internal Tides; The Effect of Temperature on Respiratory Electron Transport System in Marine Plankton; Microstructure and Intrusions in the California Current; and Measurement of Internal Waves of Tidal Frequency near a Continental Boundary.

AD-A012 049/3GA PC$3.25/MF$2.25
Lehigh Univ Bethlehem Pa Marine Geotechnical Lab
Consolidation Properties of Wilkinson Basin Soils,
Peter T. Dzwilewski, and Adrian F. Richards. 14 Mar 74, 7p
Contracts N00014-67-A-0370-0005, C-1-35357
Availability: Pub. in Jnl. of the Geotechnical Engineering Div., Proceedings of the American Society of Civil Engineers, v100 nGT10 p1175-1179 1974.

Descriptors: *Ocean bottom soils, *Soil mechanics, *Maine Gulf, Ocean bottom sampling, Engineering geology, Sedimentation, Compressive properties, Reprints.
Identifiers: Wilkinson basin, Consolidation.

Wilkinson Basin in the Gulf of Maine has been developed into a Geotechnical Test Area in which the detailed vertical and horizontal distribution of geotechnical properties in a relatively small area is known. This will enable any organization to conduct controlled field testing of ocean engineering systems in contact with the bottom. The Geotechnical Test Area is a topographic depression laying within the 260-m (850-ft) depth contour and it encompasses an area of about 400 sq km. This note reports on the consolidation properties of the Wilkinson Basin soils determined from consolidometer tests. The objectives of the study were to determine the compression index and the coefficient of consolidation, to investigate the effects of using back pressure to assure 100% saturation on the soil being tested, and to develop predictor equations for the compression index in terms of other geotechnical properties.

AD-A012 351/3GA PC$8.75/MF$2.25
Coast Guard Washington D C Oceanographic Unit
WEBSEC-71-72, An Ecological Survey in the Beaufort Sea.
Oceanographic rept. no. 64 Aug-Sep 71-72,
Gary L. Hufford, Scott H. Fortier, Daniel E. Wolfe, James F. Doster, and Dennis L. Noble. Sep 74, 282p Rept no. USCG-373-64

Descriptors: *Oceanographic data, *Marine biology, *Ecology, *Arctic Ocean, Bathythermograph data, Chemical properties, Marine geology, Water pollution, Petroleum products, Salinity, Ocean currents, Sea ice, Surface temperature, Oxygen, Wind, Phosphates, Silicates, Nitrates, Sediments, Particle size, Minerals, Oceanographic ships.
Identifiers: *Beaufort Sea, AGB4 vessel, *Baseline studies, Natchik vessel, Dissolved oxygen, DOT/5C, DOT/4GZ/GY.

The report contains a collection of scientific papers from two successive marine ecological baseline cruises to the Western Beaufort Sea (August-September, 1971 and 1972). Preliminary results of the physical, chemical, biological, and geological data are presented and interpreted. The results indicate that the data were collected in a marine ecosystem that is still in a relatively unpolluted state. The data should provide a base for assessing the affects of pollution from future development, especially from petroleum.

AD-A012 378/6GA PC$3.75/MF$2.25
Saclant ASW Research Centre La Spezia (Italy)
The SACLANTCEN Shipborne Computer Environmental Data Acquisition System. Volume 4. On-Line Data Acquisition of XBT Temperature Profiles.
Memorandum rept.,
Claude Gehin, Giovanna Martinelli, Mario Menelli, and Francesco Spina. 15 Jun 75, 34p
Rept no. SACLANTCEN-SM-70
See also Volume 2, AD-760 186. NATO furnished.

Descriptors: *Data processing, *Oceanographic data, Data acquisition, Thermoclines, On line systems, Bathythermograph data, Computer programs, Italy.

An automatic environmental data-logging and computing system installed on board SACLANTCEN's research vessel is described in a series of memoranda. This memorandum of the series describes an automatic system for contemporaneously storing and plotting temperature profiles measured by expendable bathythermograph (XBT) while the ship is underway. The stored temperature data are available for use in other programs of the system.

AD-A012 394/3GA PC$3.25/MF$2.25
Physical Sciences Inc Wakefield Mass
Microstructure Analysis.
Quarterly technical rept. 1 Mar-1 Jun 75,
Girard Simons. 15 Aug 75, 25p Rept no. PSI-TR-31
Contract N00014-75-C-0927, ARPA Order-2961

Descriptors: *Microstructure, *Oceanographic data, Internal waves, Gravity waves, Temperature, Salinity, Partial differential equations, Equations of motion, Thermoclines.
Identifiers: Internal gravity waves.

Field observations have revealed that the ocean's thermocline possesses an internal structure consisting of a series of thin, laminar 'sheets' of high gradient separated by 'steps' of only moderate density gradient. Various mechanisms have been proposed to explain the observed phenomenon. These mechanisms consist of double diffusion, interleaving, internal gravity wave breaking and internal wave steepening. In this report, the concept of interval wave steepening is examined. The authors first determine the set of admissable wave solutions and then examine the nonlinear coupling. Comparison with field data establishes the feasibility of the wave steepening approach.

AD-A012 414/9GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
A Hydrographic and Acoustic Survey of the Persian Gulf - Part I.
Master's thesis,
Jay Lee Wright. Sep 74, 87p

Descriptors: *Oceanographic data, *Underwater sound, Acoustic detection, Reviews, Seasonal variations, Surface temperature, Salinity, Acoustic velocity, Salt water, Arabian Sea, Submarines, Acoustic properties, Theses, Computer programs, FORTRAN.
Identifiers: *Persian Gulf, Hormuz Strait, FACT computer program.

A survey of literature and historical data was used to investigate the seasonal variations in the hydrographic and acoustic properties of the Persian Gulf. The Gulf has a year round salinity of about 40 parts per thousand by weight. The surface temperature varies from 30C in summer to 20C in winter. An area of significant importance in the Gulf is near the Strait of Hormuz where the Persian Gulf water encounters the warmer less saline water of the Arabian Sea. Detection ranges for diesel and nuclear submarines were investigated using the FACT acoustic transmission loss model. Generally, ranges appear to be greater in winter due to increased vertical mixing, creating strong positive sound speed gradients.

COM-75-10726/8GA PC$7.00/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Marine Ecosystems Analysis Program Office.
New York Bight Project, Water Column Sampling Cruises No. 6-8 of the NOAA Ship FERREL, April-June 1974.
Data rept.,
John B. Hazelworth, Byron L. Kolitz, Robert B. Starr, Robert L. Charnell, and George A. Berberian. Jan 75, 184p NOAA-DR-MESA-1
NOAA-75051212

Descriptors: *Oceanographic data, *New York Bight, Ocean currents, Oceanographic ships, Water chemistry, Temperature measurement, Salinity, Oceanographic surveys, Sediments, Sampling, Ocean environments, Water quality, Dissolved gases, Oxygen, Turbidity, pH, Data processing.
Identifiers: Ferrel vessel, Dissolved oxygen.

During the period April-June 1974, three oceanographic cruises, denoted 6, 7, and 8, were made by the NOAA ship Ferrel in the New York Bight. The objective of the cruises was to supply data to provide a base for analysis of the

water movements on the highly impacted ecosystem. The report presents the corrected physical and chemical data from these cruises and describes the parameters measured, the measurement methods, and the corrections applied to the data.

COM-75-10849/8GA PC$3.75/MF$2.25
National Environmental Satellite Service, Washington, D.C.
A Summary of the Radiometric Technology Model of the Ocean Surface in the Microwave Region.
Technical memo.,
John C. Alishouse. Mar 75, 31p NOAA-TM-NESS-66 NOAA-75052201

Descriptors: *Ocean surface, *Surface temperature, *Surface roughness, *Radiometers, *Remote sensing, Microwave equipment, Salinity, Sea water, Ocean waves, Power spectra, Sea states, Meteorological satellites, Polarization, Brightness, Models, Gravity waves.

Between November 1970 and March 1974, studies were pursued to determine sea-surface temperature and roughness from a satellite-borne microwave radiometer. Such factors as salinity, foam, wave spectra, polarization, and atmospheric attenuation were investigated to determine optimum frequencies and accuracy limitations. The resultant model developed is a two-dimensional two-scale model that incorporates upwind and crosswind wave spectra and considers waves that are both large and small in comparison with the radiometer's wavelength.

COM-75-10860/5GA PC$10.25/MF$2.25
National Geophysical and Solar-Terrestrial Data Center, Boulder, Colo.
Marine Geophysical Data Catalog - 1975.
Feb 75, 399p* NOAA-75053011
Key to Geophysical Records Documentation No. 4. Supersedes catalog dated Jun 72, Key to Geophysical Records Documentation no. 1. Paper copy also available from GPO.

Descriptors: *Marine geophysics, *Geophysical surveys, Catalogs(Publications), Bathymetry, Gravity, Navigation charts, Seismic surveys, Magnetic surveys, Geomagnetism, Graphs(Charts), Magnetic tape, Microfilm.
Identifiers: International Decade of Ocean Exploration.

The catalog lists marine geophysical data that are available from the National Geophysical and Solar Terrestrial data center of the environmental data service, NOAA. It includes bathymetric, magnetic, gravity, seismic, and navigation data; indicates types of records and data formats; identifies specific projects, cruises, or surveys; and depicts geographical distribution of the data by area index charts.

E75-10290 PC$7.00/MF$2.25
Long Island Univ., Greenvalle, N.Y. Science Engineering Research Group.
An Interdisciplinary Study of the Estuarine and Coastal Oceanography of Block Island Sound and Adjacent New York Coastal Waters.
Final rept., Jul 72-Jan 74,
Edward F. Yost, Rudolph Hollman, James Alexander, and Robert Nuzzi. Apr 74, 183p TR-20 NASA-CR-142834
Contract NAS5-21792
Prepared in cooperation with New York Ocean Science Lab., Montauk.
Original contains Color Imagery. Original photography may be purchased from the EROS Data Center, 10th and Dakota Ave., Sioux Falls, S.D. 57198.

Descriptors: Remote sensors, Coastal water, New York, Block Island(RI), Rhode Island, Oceanography, Earth resources program, Imaging techniques, Photointerpretation, Photometry.

The author has identified the following significant results. Photo-optical additive color quantitative measurements were made of ERTS-1 reprocessed positives of New York Bight and Block Island Sound. Regression of these data on almost simultaneous ship sample data of water's physical, chemical, biological, and optical properties showed that ERTS bands 5 and 6 can be used to predict the absolute value of the total number of particles and bands 4 and 5 to predict the relative extinction coefficient in New York Bight. Water masses and mixing patterns in Block Island Sound heretofore considered transient were found to be persistent phenomena requiring revision of existing mathematical and hydraulic models.

8K. Seismology

AD-A011 686/3GA PC$3.75/MF$2.25
California Univ Berkeley Seismographic Station
Near Field Accelerometer Array.
Final rept. 1 Jun 72-30 Nov 74,
T. V. McEvilly, and L. R. Johnson. 15 May 75, 44p AFOSR-TR-75-0824
Grant AF-AFOSR-2392-72, ARPA Order-2134

Descriptors: *Seismic data, *Seismic arrays, *Seismological stations, Earthquakes, Seismographs, Faults(Geology), Near field, Seismology, Ground motion, Sources, Earth crust, Tectonics, California, Computer programs.
Identifiers: Stone Canyon, Bear Valley.

The report outlines the accomplishments during the two and one half years of the Grant. A portable near-field accelerometer array consisting of 9 stations was developed and installed in the Stone Canyon-Bear Valley region of central California. A detailed study was made of the seismicity in this region. Fault plane solutions of over 150 earthquakes were studied. Three earthquakes were studied in detail and some interesting patterns in P and S corner frequencies in the near field were revealed.

AD-A011 691/3GA PC$4.25/MF$2.25
State Univ of New York At Stony Brook Dept of Earth and Space Sciences
Surface Waves: Source and Path Properties.
Scientific interim rept.,
Donald J. Weidner. 16 Apr 75, 59p Rept no. Scientific-1 AFCRL-TR-75-0215
Contract F19628-74-C-0092, ARPA Order-1795

Descriptors: *Ocean bottom, *Sediments, *Seismic waves, *Surface waves, Rayleigh waves, Earthquakes, Ocean bottom, Sources, Power spectra, Dispersions, Seismic data, Seismological stations, Ocean ridges, North Atlantic Ocean.
Identifiers: Love waves, Seismic discrimination, MidAtlantic Ridge.

Several characteristics of oceanic surface waves can be altered by low rigidity sediments along the propagation path. Specifically spectral shape of both Love and Rayleigh waves as well as path phase velocity can be affected. The theoretical Love wave spectra is sensitive to both the nature of the low velocity zone and the sediment structure. Thus, observed Love wave spectra do not constrain focal depth.

AD-A011 797/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge
The Maximum Acceleration of Seismic Ground Motion,
Yoshiaki Ida. 18 Oct 72, 12p AFOSR-TR-75-0790
Contract F44620-71-C-0049, Grant NSF-GA-24268
Availability: Pub. in Bulletin of the Seismological Society of America, v63 n3 p959-968 Jun 73.

Descriptors: *Ground motion, *Earthquakes, *Seismic waves, Faults(Geology), Mathematical prediction, Rupture, Wave propagation, Acceleration, Reprints.

A prediction of earthquake strong motion is attempted by studying the initial form of the seismic source-time function associated with a fracturing process described under idealized physical conditions. The effect of cohesive force on the source function is examined in detail.

AD-A011 798/6GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge
Scattering of P Waves under the Montana Lasa,
Keiiti Aki. 13 Jun 72, 14p AFOSR-TR-75-0791
Contract F44620-71-C-0049, ARPA Order-1827
Availability: Pub. in Jnl. of Geophysical Research, v78 n8 p1334-1346, 10 Mar 73.

Descriptors: *Seismic waves, Scattering, Amplitude, Time studies, Homogeneity, Earth crust, Montana, Reprints.
Identifiers: P waves.

The variations of amplitude and time delay of teleseismic P waves across the Montana Lasa (Large Aperture Seismic Array) were interpreted as being due to scattering by a random inhomogeneity in the earth's crust under the array. The prediction of the Chernov (1960) theory explains well the observed statistical properties of P waves with a frequency of 0.5 Hz. The inhomogeneity under Lasa has a correlation distance of about 10 km, with a fractional rms velocity fluctuation of 4% extending to a depth of about 60 km. (Author)

AD-A011 799/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge
Seismic Constraints on Ocean-Ridge Mantle Structure: Anomalous Fault-Plane Solutions from First Motions,
Sean C. Solomon, and Bruce R. Julian. 13 May 74, 23p AFOSR-TR-75-0793
Contract F44620-71-C-0049, Grant NSF-GA-36132X
Availability: Pub. in Geophysical Jnl. of the Royal Astronomical Society, v38 n2 p265-285 1974.

Descriptors: *Seismology, *Earth mantle, *Ocean ridges, Faults(Geology), Seismic waves, Seismic data, Velocity, Reprints.
Identifiers: Fault plane solutions.

Fault-plane solutions from P-wave first motion studies of earthquakes on the crests of actively spreading mid-ocean ridges, often appear to have non-orthoganal nodal planes. This anomaly, together with independent data from surface waves and shear waves from such events, is most simply explained as an effect of propagation of the P waves through the laterally heterogeneous mantle beneath the ridge. P-wave velocity models for the ocean-ridge mantle are derived from temperature models, the phase diagram for wet peridotite, and the expected dependence of velocity on temperature and phase. (Author)

AD-A011 952/9GA PC$3.25/MF$2.25
California Inst of Tech Pasadena Seismological Lab
Upper Mantle Shear Structure,
Donald V. Helmberger, and Gladys R. Engen. 18 Mar 74, 14p Rept no. Contrib-2460 AFOSR-TR-74-1860
Contract F44620-72-C-0078, Grant NSF-GP-40752
Availability: Pub. in Jnl. of Geophysical Research, v79 n26 p4017-4028, 10 Sep 74.

Descriptors: *Earth mantle, *Shear properties, *Seismology, Structural geology, Velocity, Seismic waves, Travel time, Earth models, Reprints.

This paper attempts to construct a preliminary shear velocity model compatible with both travel times and wave forms of observed seismograms. Transversely polarized long-range seismic measurement and World-Wide Standard Seismograph Network observations are used in this study. Vertical secondary wave signatures are demonstrated to be inadequate in identifying triplications because of contamination by PL coupled shear waves and other P-SV interactions. Well-located west coast earthquakes, modeled as shear dislocations, are used as sources. The observed SH travel times are considerably slower than the Jeffreys-Bullen values out to 30 deg. Select profiles of observed wave forms in conjunction with the travel times provide the data for model determinations by fitting the observed wave forms with synthetics. Synthetics are computed for a number of current models as preliminary attempts at fitting the data. Models containing large sharp transitions predict strong second arrivals beyond 30 deg. Models containing low-velocity zones between 400 and 700 km predict complicated wave shapes between 20 deg and 25 deg. None of the above features are apparent in observed SH wave forms. The final model is relatively smooth and exhibits the same characteristics as the HWB P model (Wiggins and Helmberger, 1973), except that the percentage velocity jump is much less at 400 km and slightly larger at 500 km. The 600-km transition is subdued similar to that of the P model. (Author)

8L. Snow, Ice, and Permafrost

AD-A012 113/7GA PC$4.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Compressibility Characteristics of Undisturbed Snow.
Research rept.,
Gunars Abele, and Anthony J. Gow. May 75, 62p Rept no. CRREL-RR-336

Descriptors: *Snow, *Compressive properties, *Trafficability, Stresses, Deformation, Temperature, Density, Pressure, Test methods, Cold regions, Crystallization, Texture, Army operations, Greenland, Arctic regions.

The effects of snow temperature, rate of deformation, and initial density on the stress vs density and stress vs deformation relationships were investigated in the pressure range of 0.1 to 75 bars. The rate of deformation in the range of 0.027 to 27 cm/sec does not have a significant effect. A decrease in temperature in the range of 0 to -40C increases the resistance to stress and deformation, the temperature effect increasing with applied pressure and initial density. The effect of initial density is significant. For any stress, an increase in the initial density results in an incrase in the resulting density, particularly at low stress levels and at temperatures near 0C. The texture of artifically compacted snow is significantly different from that of naturally compacted snow of the same density because of the very short recrystallization time period.

AD-A012 116/0GA PC$3.75/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Growth of Ice Crystals on Solid Surfaces,
P. A. Shumskii. Jul 75, 42p Rept no. CRREL-TL-483
Draft trans. of mono. Voprosy Geologii Azii, Moscow, 1955 p565-595.

Descriptors: *Ice, *Crystal growth, Orientation(Direction), Crystallization, Arctic regions, Permafrost, Translations, USSR.

This report discusses the general problem of the growth of crystals. It includes a short history of the phenomenon of accumulation of ice crystals. The processes of the structural formation of a polycrystalline unit are discussed. The theory of a passive orienting influence of a surface on growing crystals is considered.

COM-75-10904/1GA PC$3.75/MF$2.25
Alaska Univ., College. Geophysical Inst.
A Conceptual Model of Offshore Permafrost.
Scientific rept.,
T. E. Osterkamp. Apr 75, 27p UAG-R-234, Sea Grant-75-3 NOAA-75060504
Grant NOAA-04-3-158-41
Sponsored in part by Alaska Oil and Gas Association, Anchorage.

Descriptors: *Permafrost, *Erosion, *Coasts, *Alaska, Mathematical models, Boundary layer, Thermodynamics, Seasonal variations, Chemical properties, Salt water intrusion, Frozen soils, Thermal conductivity, Soil profiles, Beaufort Sea.
Identifiers: Sea Grant program.

The coastal erosion process has been examined for the northern Alaskan coast for the purpose of developing a conceptual model of offshore permafrost. A series of as many as five stages of coastal erosion, characterized by different thermal and chemical boundary conditions, is necessary to describe the physical setting of the offshore permafrost. The seasonal variations of thermal and chemical boundary conditions are discussed, and incorporation of these varying boundary conditions into a model of offshore permafrost, consisting of the generalized transport equations from non-equilibrium thermodynamics, is suggested. This can be accomplished by successive application of the transport equations to the five stages experienced by a vertical soil profile during the erosion process.

8M. Soil Mechanics

AD-A012 106/1GA PC$7.00/MF$2.25
Cornell Aeronautical Lab Inc Buffalo N Y
Off-Road Mobility Research.
Semi-annual technical rept. no. 2, 9 Feb-8 Aug 67.
Sep 67, 176p Rept no. CAL-VJ-2330-G-2
Contract DAHC04-67-C-0005, ARPA Order-841

Descriptors: *Vehicles, *Offroad traffic, *Mobility, Soils, Trafficability, Soil mechanics, Human factors engineering, Terrain intelligence.
Identifiers: *Soil wheel interactions, *Soil tire interactions, *Soil vehicle interactions, *Terrain vehicle interactions, *Offroad mobility.

An interim summary research and engineering studies being conducted in the area of off-road mobility is presented. These studies have been initiated as part of a long-term plan which has the objective of augmenting knowledge and methods available to military planning, engineering, and field personnel for purposes of improving ground mobility. The activities dealt with embrace the modeling of the human-vehicle-environment system and detailed technical studies of soil mechanics, vehicle-terrain interactions, human factors and environmental factors organic to the system. These technical studies are expected to provide inputs for mobility prediction and evaluation and form the basis for knowledgeable assessment of off-road mobility research.

AD-A012 143/4GA PC$4.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Evaluation of Empirical and Analytical Procedures Used for Predicting the Rigid Body Motion of an Earth Penetrator.
Final rept.,
Paul F. Hadala. Jun 75, 81p Rept no. AEWES-Misc-Paper-S-75-15
Sponsored in part by Defense Nuclear Agency, Washington, D.C.

Descriptors: *Soils, *Projectiles, *Penetration, Soil mechanics, Impact, Field tests, Ballistic testing, Canada.

This report presents a comparison of five pretest predictions with the measured rigid body motion of a large penetrator normally impacting the Watching Hill Blast Range at the Defence Research Establishment, Suffield, Ralston, Alberta, Canada, at an impact velocity of about 500 ft/sec. The prediction methods used were evaluated in detail. They included the Sandia empirical penetration formulas, the spherical and cylindrical cavity expansion theories, a viscoplastic force 'law', and the AVCO differential area force 'law'. The capability of predicting peak rigid body deceleration and maximum penetration within a factor of two of measured test data was demonstrated by several of the methods.

AD-A012 146/7GA PC$4.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Measuring Soil Properties in Vehicle Mobility Research. Report 7. Behavior of Fine-Grained Soils under High-Speed Tire Loads.
Technical rept.,
Gerald W. Turnage. Jun 75, 68p Rept no. AEWES-TR-3-652-7
See also Technical rept. no. 6, dated Jul 74, AD-781 991.

Descriptors: *Forward areas, *Offroad traffic, *Soil resistant properties, Soil dynamics, Mobility, Aircraft tires, Vehicles, Loads(Forces).
Identifiers: *Soil tire interactions.

This study examined the effects of wheel speed on the performance in fine-grained soils of single pneumatic tires, full-size wheeled vehicles, and a prototype aircraft under several tire operational modes.

AD-A012 170/7GA PC$3.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Frozen Soil: A Material to Solve Problems in the Construction Industry (Suelo Congelado: Un Material para la So Lucion do Problemas en la Industria de la Construccion),
J. A. Careaga, and E. R. Mayer. Jun 75, 20p Rept no. CRREL-TL-480
Draft trans. of Inter-American Conference on Materials Technology (3rd), Mexico City, 1972 p57-64.

Descriptors: *Soils, *Freezing, Foundations(Structures), Construction, Processing, Liquid nitrogen, Soil stabilization, Test methods, Injection, Acceptability, Costs, Translations, Mexico.
Identifiers: *Frozen soils.

Digging a well, restoring the foundations of a building or digging a tunnel in the soils of big cities constitute difficult projects due to a large number of already existing pipelines and sewers. When the city has a clayey subsoil with some content of water and highly permeable sandy lenses, risks of settlement, water leaks, or erosion necessitate the employment of special expensive construction methods. The National Autonomous University of Mexico developed an accelerated soil freezing process for use in emergency work involving the direct injection of liquid nitrogen through the ground to be stabilized. This article presents the principal results obtained by this method as well as considerations of an economic nature on the applicability of the technique as well as a comparison with other conventional-type freezing methods.

N75-24066/3GA PC$3.25/MF$2.25
Bittinger (M. W.) and Associates, Inc., Fort Collins, Colo.
Ground Truth Procedures, Phoenix Soil Moisture.
Mission Report, 19-22 Mar. 1975.
E. B. Jones. Apr 75, 11p NASA-CR-143795
Contract NAS5-22312

Descriptors: *Ground truth, *Moisture content, *Soils, Quality control, Remote sensors, Sampling, Vegetation.

For abstract, see STAR 1315

PB-242 710/2GA PC$9.50/MF$2.25
IIT Research Inst., Chicago, Ill.
Determination of the in-situ State of Stress in Soil Masses.
Final rept.,
Peter J. Huck, Howard J. Pincus, Madan M. Singh, and Y. P. Chugh. Sep 74, 336p* IITRI-D6083-FR FHWA/RD-74-68
Contract DOT-FH-11-8082

Descriptors: *Tunneling(Excavation), *Soil mechanics, Stresses, Soil structure, Subsurface investigations, Stress concentration, Instrumentation.
Identifiers: DOT/4BZ/BA, DOT/4CZ/CC.

The mass behavior of soil and the loadings imparted to civil engineering works by soil masses are strongly influenced by the naturally existing in-situ soil stresses. The determination of in-situ stresses in soil masses is a difficult problem which, in some cases, requires extensive and subtle evaluation if even an approximate determination is to be made. These studies were conducted to review and assess techniques. Methods for estimating in-situ stress from a knowledge of the soil and assumed stress history, as well as direct measurement methods are identified and described. All known methods for determining in-situ stresses are summarized. Recommendations are made for the development of more sophisticated hardware, transfer and development of fabric analysis technology to soil mechanics, and long range development of magnetic resonance techniques.

PB-242 731/8GA PC$5.75/MF$2.25
Texas Transportation Inst., College Station.
Correlation of the Texas Highway Department Cone Penetrometer Test with Unconsolidated-Undrained Shear Strength of Cohesive Soils.
Interim rept. Sep 73-Aug 74,
Manaf M. Hamoudi, Harry M. Coyle, and Richard E. Bartoskewitz. Aug 74, 145p TTI-2-5-74-10-1

Descriptors: *Soil tests, *Cohesive soils, *Pile foundations, Triaxial tests, Shear strength, Soil classification, Sands, Silts, Clay soils, Measuring instruments, Rheological properties, Correlation techniques, Texas, Highway bridges.
Identifiers: DOT/4BZ/BA, DOT/5M.

Correlations were established between the Texas Highway Department Cone Penetrometer Test and the unconsolidated-undrained shear strength for cohesive soils. Both field and laboratory investigations were conducted to obtain the data necessary to establish the correlations. The field investigations included seven borings taken at four different sites where the Cone Penetrometer Test was conducted and undisturbed soil samples were obtained. The Texas Triaxial Test and the ASTM Triaxial Test were used in the laboratory investigation to obtain soil shear strength. Soils were classified and grouped by the Unified Soil Classification System.

PB-242 859/7GA PC$6.25/MF$2.25
Oklahoma State Univ., Stillwater.
Use of Soil Parameters for Describing Pesticide Movement Through Soils.
Final rept. 1 May 72-31 Aug 74,
J. M. Davidson, G. H. Brusewitz, D. R. Baker, and A. L. Wood. 31 Aug 74, 164p* EPA-660/2-75-009
Grant EPA-R-800364

Descriptors: *Soil water, *Water flow, *Pesticides, Soil properties, Adsorption, Surface water runoff, Desorption, Soil profiles, Dispersing, Diffusion, Fluid infiltration, Flow rate, Difference equations, Mathematical models, Pore pressure, Hydraulic conductivity, Computer programs, Test methods.
Identifiers: Path of pollutants, Soil water movement.

Solutions of a differential equation for solute transport are described for both transient and steady state soil water conditions. The solutions use independently measured soil and soil-pesticide adsorption-desorption characteristics to describe the movement of a pesticide in a soil profile. Owing to the complexity of the soil-pesticide adsorption-desorption characteristics, numerical solutions of the soil water flow and solute transport equations were used. Numerical dispersion in the finite difference solution of the solute transport equation was considered and a correction included in the solution. Experimental results from laboratory and field studies were used to test the numerical solutions for their ability to describe the movement and distribution of pesticides in a soil profile with time.

8N. Terrestrial Magnetism

N75-24208/1GA PC$3.25/MF$2.25
Denver Univ., Colo. Dept. of Physics and Astronomy.
A Study of Geomagnetic Storms.
Final Report, Oct. 1973 - Apr. 1975.
V. L. Patel. Apr 75, 4p NASA-CR-142800
Contract NGR-06-004-123

Descriptors: *Explorer 33 satellite, *Explorer 35 satellite, *Interplanetary magnetic fields, *Magnetic storms, Electric fields, Plasmas (Physics), Satellite observation.

For abstract, see STAR 1315

9. ELECTRONICS AND ELECTRICAL ENGINEERING

9A. Components

AD-A011 694/7GA PC$4.25/MF$2.25
Rockwell International Corp Thousand Oaks Calif Science Center
1.06 Micrometer High Sensitivity IR Photocathode.
Final rept. 2 Jan-2 Oct 74,
J. S. Harris, Jr., and R. Sahai. Jan 75, 70p Rept no. SC575.10TR AFAL-TR-74-341
Contract F33615-74-C-1085
See also report dated Aug 73, AD-912 522.

Descriptors: *Infrared detectors, *Photocathodes, *Photodiodes, Gallium arsenides, Gallium antimonides, Semiconductor diodes, Photosensitivity, Epitaxial growth, Semiconducting films, Electron transport, Band theory of solids, Luminescence, Fabrication.
Identifiers: Design, Heterojunctions.

The design and progress towards a field-assisted double heterojunction photocathode with high quantum efficiency at 1.06 micrometers is reported. The basic device design was developed and the concept feasibility was demonstrated in a preceeding program. In this program the authors have further improved the design and achieved uniform and reproducible performance from the test devices. Internal electron transport efficiencies approaching 70 percent have been measured. However, the external quantum efficiency at 1.06 micrometers is low due to an unfavorable bandgap grading in the GaAsSb absorber layer. Further work to optimize the device design is recommended to realize the great potential of this double heterojunction structure for field-assisted photoemission.

AD-A011 722/6GA PC$4.25/MF$2.25
Maxwell Labs Inc San Diego Calif
Capacitors for Aircraft High Power.
Final rept. Feb 73-Feb 75,
Paul S. Hoffman. 12 Feb 75, 63p AFAPL-TR-75-19
Contract F33615-73-C-2029

Descriptors: *Capacitors, Energy storage, High energy, High density, Dielectrics, Aircraft equipment.

The purpose of the program was to develop compact, high-energy density, pulse-discharge capacitor designs to yield energy density values of 500 joules/lb as a goal, as well as capacitors with the greatest potential for high power transfer.

AD-A011 802/6GA PC$4.25/MF$2.25
RCA Labs Princeton N J
Transferred-Electron-Device (TED) Technology Impact Study.
Final rept. 1 Oct 74-31 Mar 75,
Markus Nowogrodzki, and S. Yegna Narayan. Jun 75, 53p Rept no. PPRL-75-CR-24-Vol-1
Contract N00014-75-C-0077

Descriptors: *Semiconductor devices, *Signal processing, Gallium arsenides, Microwave equipment, Solid state electronics, State of the art, Reviews.
Identifiers: *Transferred electron devices.

The objective of the overall program reviewed in the report was the assessment of the impact of a new technology - that of signal processing by means of transferred-electron devices (TEDs) - on a particular class of systems of interest to the U.S. Navy. This volume contains the findings of the first task; it describes the state-of-the-art of transferred electron devices used for signal processing purposes, and it provides projections of short-range progress in the device and system technologies.

AD-A011 809/1GA PC$3.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Prototype Powerline Transient Source and Direction of Propagation Detector.
Final technical note, Jul 73-Sep 74,
M. N. Smith, and K. T. Huang. May 75, 22p Rept no. CEL-TN-1388

Descriptors: *Transmission lines, *Transients, *Detectors, Electric power distribution, Electric power transmission, Electric power.
Identifiers: *Power lines.

Random impulse voltage transients that occur on electrical power distribution systems can cause physical damage to critical loads, resulting in operational failure. There are numerous transient detection devices, but until recently no device could determine the direction of propagation of transients on a powerline. This report is an evaluation of two prototype transient-direction detectors. Tests revealed they provide a simple and accurate means of locating the source of impulse transients on electrical powerlines.

AD-A011 814/1GA PC$3.75/MF$2.25
Naval Research Lab Washington D C

Broadband, High-Performance Couplers with Dielectric Overlays for Microwave Integrated-Circuit Applications.
Boris Sheleg, and Barry E. Spielman. 28 May 75, 42p Rept no. NRL-7872

Descriptors: *Waveguide couplers, Directional, Microwave equipment, Integrated circuits, Broadband, Strip transmission lines, Computer aided design.
Identifiers: *Directional couplers.

A systematic design approach is used to develop a class of high-performance, broadband, directional couplers for microwave integrated-circuit application. The couplers are characterized by two asymmetric quarter-wavelength coupling sections covered by dielectric overlays. All design parameters of these couplers, except the overlay thickness, are determined by computer analysis. This approach, which minimizes the empirical operations and improves the predictability and repeatability, results in a coupler design suitable for integrated systems production. The design, fabrication, and evaluation of 6-, 10-, and 20-dB directional couplers is presented. The measured and predicted performance characteristics of these couplers compare well and demonstrate the use of this systematic coupler-design approach. Sufficient design detail and discussion is included to permit reproduction of these dielectric-overlay couplers.

AD-A011 850/5GA PC$4.25/MF$2.25
Hughes Research Labs Malibu Calif
High Current Crossed-Field Tube Development.
Final technical rept. 19 Apr 74-18 Apr 75,
Robin J. Harvey, and Michael A. Lutz. May 75, 64p
Contract N60921-74-C-0275

Descriptors: *Crossed field devices, *Interrupters, High power, Electronic switching, Electronic switches.

A crossed-field tube has successfully interrupted 10 kA against 100 kV without the use of a voltage recovery rate limiting capacitor. A smaller diameter tube, specifically constructed for this program interrupted 7.8 kA against 100 kV. These results confirm a semi-empirical scaling law which predicts the peak interruptable current level I(kA) = r(cm)/3 where r is the mean electrode radius. Experiments using dual anode feedthrough bushings to reduce the self-magnetic field did not prove effective, indicating that this field may not be responsible for the current limitation. Double pulse interruptions were accomplished at 5.9 kA against 66 kV with an interpulse time of 16.7 msec (to approximate 50 Hz operation). No difficulties were encountered under these conditions indicating that repetitive operation does not cause significant gas pressure fluctuations. Also, dissipation calculations and measurements were made for a 100 microsec square current pulse interrupted against 100 kV. The dissipated energy per shot was found to be 250 J/kA.

AD-A011 906/5GA PC$7.50/MF$2.25
RCA Labs Princeton N J
Basic Adhesion Mechanisms in Thick and Thin Films.
Final rept. 1 Jan-31 Dec 74,
Thomas T. Hitch, and Kenneth R. Bube. 31 Jan 75, 227p Rept no. PRRL-75-CR-3
Contract N00019-74-C-0270

Descriptors: *Electric conductors, *Metallizing, Thick films, Thin films, Gold, Adhesion, Inks, Substrates, Alumina, Reliability(Electronics), Hybrid circuits, Microelectronics.

Seventeen commercial, gold-based thick-film conductor inks and four alumina substrates (two each, 96 and 99.5 wt pct) were characterized physically and chemically. These characterizations were performed on as-received materials. Films were screen-printed and singly fired and refired 5 times in accordance with manufacturer recommendations commensurate with thick-film hybrid microelectronic usage; adhesion strength, conductivity, and other properties of the films were measured and are reported.

AD-A011 930/5GA PC$3.25/MF$2.25
Stanford Univ Calif Microwave Lab
Microwave Acoustic and Bulk Device Technique Studies.
Interim rept. 1 May-31 Oct 74.
May 75, 25p Rept no. ML-2401 RADC-TR-75-140
Contract F30602-74-C-0038
See also report dated Sep 74, AD-787 869.

Descriptors: *Microwave equipment, *Signal processing, *Acoustic equipment, Gallium arsenides, Zinc compounds, Oxides, Transducers, Thin films, Substrates, Surface waves, Acoustic waves, Schottky barrier devices, Monolithic structures(Electronics), Delay lines, Semiconducting films, Epitaxial growth, Interactions.
Identifiers: *Acoustic surface waves, Interdigital transducers, Zinc oxides, Microwave acoustics, Convolvers.

This report is the second Interim Technical Report on the contract. It covers research done on acoustic surface wave devices during the six month period 1 May to 31 October 1974. The objective of the research is the generation of new device concepts and the analytical and experimental verification as to their ultimate usefulness for signal processing applications. Improvements were made in acoustic surface wave convolver efficiency. The surface wave convolver can be used for performing convolution/correlation, time reversal and Fourier analysis of arbitrary signals. A new approach which may lead to low cost, simplified analog/digital conversion has been devised. This combines a surface acoustic wave delay line and external digital circuitry.

AD-A011 933/9GA PC$3.25/MF$2.25
Ohio State Univ Columbus Electroscience Lab
Measurement of the Power Handling Capability of Resonant Slot Arrays.
Technical rept.,
G. W. Doyle, and R. D. Fulton. Apr 75, 18p Rept no. ESL-3622-1 AFAL-TR-75-27
Contract F33615-73-C-1173

Descriptors: *Radomes, *Waveguide slots, *Breakdown(Electronic threshold), Slots, Cassegrain antennas, Power levels, Dielectrics, Dielectric waveguides.
Identifiers: *Slot arrays.

This report is a summary of an investigation to determine the incident power density which a resonant slot array can handle without causing permanent structural damage. The effect of altitude, varying the slot width, and also encasing the element in dielectric was measured for several different types of reactively loaded slots as well as circular slots. The effect of varying the element-to-element spacing in the array is explained. The significance of this research to the Air Force is that it provides guidelines for the design of periodic slotted surfaces as used in metallic radomes, subreflectors for cassegrain antennas, and space filters in general.

AD-A011 949/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Error Analysis of a Variable-Power Divider.
Technical rept.,
Leon J. Ricardi. 9 Jun 75, 25p Rept no. TN-1975-32 ESD-TR-75-186
Contract F19628-73-C-0002

Descriptors: *Power dividers, Phase shift circuits, Errors, Probability, Junctions, Variables, Waveguide couplers.

Errors in the division of power by a variable-power divider using phase shifters and a pair of 3-dB couplers are determined as a function of an incorrect setting of the phase shifters. The insertion phase, of the phase shifters, is assumed to have a Gaussian distribution about the desired value and the resultant probability distribution of the power division is calculated. Curves are given for the probability that P sub A falls within a given error. These curves are computed from the probability density function of P sub A which is also shown graphically.

AD-A012 282/0GA PC$3.25/MF$2.25
Hughes Aircraft Co Torrance Calif Electron Dynamics Div
Production Engineering Measures Vapor Phase Cooled Traveling-Wave Tubes.
Quarterly progress rept. no. 11, 2 Dec 74-1 Mar 75,
David B. Giguere. Mar 75, 14p Rept no. EDD-W-05231-11
Contract DAAB05-72-C-5863
See also report no. 10 dated Dec 74, AD/A009 589.

Descriptors: *Traveling wave tubes, Production engineering, C band, Microwave equipment, Vapor phases, Cooling, Fabrication, Test methods.
Identifiers: *Production engineering measures.

The report covers the eleventh quarterly effort of a Production Engineering Measures Program to establish a manufacturing capability for vapor phase cooling of high-efficiency C-band traveling-wave tubes. Discussions are presented which cover the fabrication of the fifth 636H TWT, and the analysis of the torsional constraints required by the mechanically vapor sealed package design of the fifth tube. Also included are a description of the RF test results accumulated to date on the fourth 636H and the results of the shock and vibration tests performed on the second and third (Engineering Sample) TWTs.

AD-A012 355/4GA PC$5.75/MF$2.25
Georgia Inst of Tech Atlanta Radar Div
Integrated Circuit Reliability and Manufacturing Science (ICRMS) - A Technical Overview.
Interim rept.,
C. E. Holland, Jr., J. J. Heckman, T. M. Miller, Jr., and J. V. Vogt. Nov 74, 136p NELC-TR-1497-2
Contract N00039-73-C-0261

Descriptors: *Integrated circuits, *Semiconductor devices, *Reliability(Electronics), Bipolar transistors, Metal oxide semiconductors, Manufacturing, Cost estimates, Wafers, Surface finishing, Automation, Photolithography, Semiconductor doping, Dielectric films, Thin films, Metallizing, Bonding, Test methods.
Identifiers: Large scale integrated circuits, Automatic control.

The present state-of-the-art in IC manufacturing is described in terms of electrical and physical limitations. The critical limitations of present IC manufacturing techniques and promising advanced fabrication techniques for overcoming these limitations are described for basic IC process areas. These process areas include wafer cleaning and handling, patterning, dielectric film formation, doping, metalization, bonding, assembly, packaging, diagnostics, prognostics, automation and control. In each of these areas, the potential benefits which could be realized by the Navy through the development of advanced manufacturing techniques are forecast in terms of future IC reliability, cost, complexity, and performance.

AD-A012 360/4GA PC$3.75/MF$2.25
Mcdonnell Douglas Astronautics Co-East St Louis Mo
Development of Technology for Assessment of Electromagnetic Coupling - Enclosure Coupling.
27 Nov 74, 49p Rept no. MDCE-1178
Contract N00178-74-C-0524

Descriptors: *Microwaves, *Electromagnetic shielding, *Radiofrequency cables, Coupling circuits, Connectors, Statistical analysis, Anechoic chambers, Effectiveness.

The trend to higher powered radiating equipment on the one hand, and to more sensitive solid state components on the other hand, is the motivation for the High Power Effects Program. The effort to determine adverse effects on electronic systems due to high power environments which are indigenous to Naval operations has three divisions: radio frequency environment, coupling from the environment to components, and the effects of radio frequency energy on the components. This report discusses an investigation of the coupling of microwave radiation to loads terminating cables inside enclosures that have discontinuities.

AD-A012 367/9GA PC$4.25/MF$2.25
Naval Ordnance Station Louisville Ky
Develop Magnetic Coil Design and Manufacturing Capability.
Final rept.,
Thomas E. Alves. Nov 74, 70p Rept no. NOSL-MT-022

Descriptors: *Machine tools, *Magnet coils, *Fabrication, Wire winding machines, Manufacturing, Filament wound construction, Forming techniques, Swaging, Machine shop practice.

This project describes how the theory, design, and manufacturing knowledge have been acquired and used to develop an 'in-house' capability for the fabrication of magnetic forming coils. The major sub-tasks of familiarization, equipment and material acquisition, and development work are described. Four expansion coil descriptions are given, together with manufacturing and testing procedures. A typical air-cooled, electromagnetic expansion coil is illustrated, together with a sequential description of fabrication.

AD-A012 405/7GA PC$4.75/MF$2.25
Raytheon Co Waltham Mass Microwave and Power Tube Div
Development of Large Rare Earth-Cobalt Magnetis for Microwave Tubes.
Final rept.
Jun 75, 78p Rept no. PT-4467
Contract N00039-73-C-0280

Descriptors: *Permanent magnets, *Cobalt alloys, *Microwave tubes, Focusing, Rare earth compounds, Intermetallic compounds, Samarium compounds, Fabrication, Powder metallurgy, Praseodymium, Sintering, Magnetic circuits.

The program's objective is to extend the application of rare earth-cobalt magnets to large microwave tubes by adapting the existing technology to provide highly uniform, high energy product permanent magnets in sizes up to 3 inches in diameters. In large sizes, the cost of magnet material fabricated from Sm-Co is often prohibitive. Therefore the development of lower cost magnet materials was pursued. The weight and cost savings, along with systems improvement to be realized with the availability of these large magnets, were demonstrated by developing magnetic circuit designs for microwave tubes now using larger or more costly methods of magnetic focusing.

COM-75-10711/0GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Electronic Technology Div.
Semiconductor Measurement Technology: A Basic Program for Calculating Dopant Density Profiles from Capacitance-Voltage Data.
Final rept. Sep 72-Sep 74,
Richard L. Mattis, and Martin G. Buehler. Jun 75, 43p NBS-Special Pub-400-11
ARPA Order-2397
Sponsored in part by Defense Nuclear Agency, Washington, D.C. Library of Congress Catalog Card no. 75-619089.
Paper copy also available from GPO as C13.10:400-11.

Descriptors: *Semiconductor doping, *Junction diodes, Computer programs, Silicon, Semiconductors, Density(Number/volume), Capacitance, Electrical potential, Semiconductor devices, BASIC programming language, Additives.
Identifiers: CV1 computer program, CV2 computer program.

A computer program is presented which is suitable for calculating dopant density vs. depth profiles from capacitance-voltage data for the case of a Gaussian-diffused p-n junction diode. The program includes corrections for peripheral capacitance of round or rectangular diodes and back depletion of the space charge region into the diffused layer. Inputs to the program consist of the surface dopant density, the junction depth, the background dopant density in the diffused layer, the junction diameter, three scaling parameters, and the capacitance-voltage data pairs. Output from the program is in the form of a plot and an optional listing of dopant density as a function of depth. The equations underlying the program are given and are related to the program whose operation is described in detail. A second program, for generating idealized capacitance-voltage data pairs. Output from the program is in the form of a plot and an optional listing of dopant density as a function of depth. The equations underlying the program are given and are related to the program whose operation is described in detail. A second program, for generating idealized capacitance-voltage data for a Gaussian-diffused diode on material with a constant dopant density is also included.

COM-75-10741/7GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Electronic Technology Div.
Semiconductor Measurement Technology: Quarterly Report July 1 to September 30, 1974,
W. Murray Bullis. May 75, 62p NBS-Special Pub-400-12
ARPA Order-2397
Sponsored in part by Defense Nuclear Agency, Washington, D.C. and Strategic Systems Project Office (Navy), Washington, D.C.
Paper copy also available from GPO as C13.10:400-12.

Descriptors: *Semiconductor devices, *Semiconductors, *Process control, Quality control, Silicon, Hall effect, Measurement, Activation energy, Nondestructive tests, Bonding, Thermal properties, Hermetic seals, Microelectronics, Circuit interconnections, Electrical resistance, Crystal defects, Films.
Identifiers: Charge coupled devices, Beam lead devices, Acoustic emissions, Flying spot scanners.

The quarterly progress report describes NBS activities directed toward the development of methods of measurement for semiconductor materials, process control, and devices. The emphasis is on silicon device technologies. Principal accomplishments during this reporting period include (1) completion of Hall effect measurements to determine activation energies of the gold donor and acceptor levels in silicon; (2) successful direct measurement of fast interface state density with the circular CCD test structure; and (3) demonstration of the feasibility of the use of acoustic emission as a nondestructive means for testing individual beam-lead bonds.

COM-75-10753/2GA PC$4.75/MF$2.25
National Bureau of Standards, Washington, D.C. Office of Consumer Product Safety.
Aluminum Branch Circuit Wiring in Residences. Summary Report for the Consumer Product Safety Commission, January-September 1974.
Jun 75, 92p NBSIR-75-723

Descriptors: *Wiring, Electric wire, Residential buildings, Aluminum, Safety, Electric connectors.

The report is a compendium of information on aluminum wiring in residences, originally prepared for the Consumer Product Safety Commission. It contains a summary of experimental research carried on at the NBS laboratories on the problems of terminating aluminum wires to screw connections as well as other pressure connectors. Since this report is an overview of the technical aspects of the aluminum wiring problem, it also contains a review by NBS staff members of available material furnished by Underwriters Laboratories and Battelle Institute. Both of these institutions are major contributors to this particular field of information. The report also includes abstracts by NBS staff of some four volumes of testimony taken at public hearings at Washington, D.C. and Los Angeles, California during the spring of 1974. Additional information on the pertinent physical properties of aluminum, information on failure mechanisms, possible corrective actions, connector cycling tests, etc., is given in a brief literature survey and two relevant memoranda on the subject. The report concludes with a fairly extensive bibliography.

JPRS-64719 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
High Voltage AC Disconnects, General Technical Specifications,
V. S. Babkin. 7 May 75, 21p GOST-689-69
Trans. of mono. Razyediniteli Peremennogo toka Vysokogo Napryazheniya, Obshchie Tekhnicheskie Trebovaniya, Moscow, 1969 p1-16.

Descriptors: *Electric switches, Disconnect fittings, High voltage, Alternating current, Specifications, Translations, USSR.

The report contains the technical specifications for the All-Union state Standard 689-69 high voltage AC disconnects.

JPRS-64807 PC$4.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
High Voltage AC Breakers, General Technical Specifications.
20 May 75, 51p GOST-687-70
Trans. of mono. Vyklyuchateli Peremennogo toka Vysokogo Napryazheniya, Obshchie Tekhnicheskie Trebovaniya, Moscow, 1970 45p.

Descriptors: *Circuit breakers, High voltage, Alternating current, Specifications, Translations, USSR.

The report contains general technical specifications for high voltage AC breakers as listed in GOST 687-70.

N75-23850/1GA PC$3.75/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.

Group 9A—Components

Functioning of Power Rectifiers and Thyristors from 1 January 1970 to 31 December 1972, Noting Carrier Injection, Emitter Shorts, Ignition, and Breakdown.
E. Spenke, and J. Burtscher. May 75, 28p NASA-TT-F-16365, BMFT-FB-T-7407
Contract NASW-2483
Tran-Transl. Into English from German Report No. Bmft-FB-T-7407, May 1974 29 p.

Descriptors: *Carrier injection, *Electrical faults, *Short circuits, *Thyristors, Electric ignition, Electric potential, Electrical resistivity, Infrared radiation, Rectifiers, Surges.

For abstract, see STAR 1315

N75-23938/4GA PC$4.25/MF$2.25
Heimann G.m.b.H., Wiesbaden (West Germany).
Image-Storage Tube for Space Applications. Development of the Sec Target.
Final Report.
C. Kunze, and W. Heimann. Nov 74, 62p ESRO-CR-212
Contract ESTEC-1457/71

Descriptors: *Conduction electrons, *European space programs, *Image tubes, *Target recognition, Electron guns, Equipment specifications, Modulation transfer function, Performance tests, Secondary emission, Storage stability.

For abstract, see STAR 1315

N75-24506/8GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Investigation of New Dielectrics for Miniaturized High-Performance Capacitors.
M. Perigord. Jun 75, 19p NASA-TT-F-16383
Contract NASW-2481
Tran-Transl. Into English from Radiotechnique-Compelec (Paris), Dec. 1973 12 p. Subm-Prepared in Cooperation with Bordeaux Univ., (France).

Descriptors: *Capacitors, *Dielectrics, *Miniature electronic equipment, Evaporation, Flashing (Vaporizing), Fluorides, Grinding (Comminution), Thin films.

For abstract, see STAR 1315

9B. Computers

AD-A011 696/2GA PC$4.25/MF$2.25
Mitre Corp Bedford Mass
Downgrading in a Secure Multilevel Computer System: The Formulary Concept,
D. F. Stork. May 75, 63p Rept no. MTR-2924 ESD-TR-75-62
Contract F19628-73-C-0001

Descriptors: *Data processing security, Mathematical logic, Network flows, Graphics.
Identifiers: PDP 11/45 computers, *Computer privacy, *Computer information security, Graph theory.

The tasks to be performed during the development of the Secure Multilevel Data Base System include the construction of a capability for the transformation of data of higher levels of classification to data at lower levels. The capability is to be part of a system in which access control is based upon a security kernel for the PDP-11/45. In this report a mechanism for facilitating downward transformations is developed, and the impact of the mechanism upon both the Bell-LaPadula model of secure computer systems and the security kernel is discussed. An expository treatment of the model and kernel is also included.

AD-A011 702/8GA PC$4.75/MF$2.25
Rockwell International Corp Anaheim Calif Electronics Research Div
Effects of Nuclear Radiation on Magnetic Bubble Domain Materials and Devices.
Final rept. 1 May 73-31 Dec 74,
Ross A. Williams. Jan 75, 91p Rept no. C73-554/501 AFCRL-TR-75-0037
Contract F19628-73-C-0250
See also report dated Oct 73, AD-782 015.

Descriptors: *Thin film storage devices, *Memory devices, *Transient radiation effects, *Magnetic domains, Shift registers, Thick films, Garnet, Radiation effects, X rays, Magnetic detectors, Magnetic alloys, Gamma rays.
Identifiers: *Magnetic bubble domains, Permalloys.

The effort concentrates on radiation-induced failure thresholds and associated mechanisms for magnetic bubble domain devices. However, experiments to investigate the effects of low-energy X rays on bubble domain materials are also described. In the low-energy X-ray studies, changes in hard bubble suppression properties, or ferromagnetic-resonance spectra, were looked for in either of two types of iron garnets exposed to more than 6,000,000 R. The primary effort concerned transient radiation-induced memory loss. A 30 ns pulse of approximately 1.5 MeV electrons was used. Failure probabilities as a function of dose per pulse were obtained for several devices. Transient radiation-induced burnout of domain sensors was also studied for both thin (300 A) and thick (4000 A) permalloy detectors.

AD-A011 712/7GA PC$5.25/MF$2.25
Mitre Corp Bedford Mass
The Design and Specification of a Security Kernel for the PDP-11/45,
W. L. Schiller. May 75, 117p Rept no. MTR-2934 ESD-TR-75-69
Contract F19628-75-C-0001

Descriptors: *Data processing security, Input output processing, Memory devices, Computer programming, Mathematical logic, Mathematical models.
Identifiers: PDP 11/45 computers, MULTICS system, Virtual memory, *Computer privacy, *Computer information security.

This paper presents the design of a kernel for certifiably secure computer systems being built on the Digital Equipment Corporation PDP-11/45. The design applies a general purpose mathematical model of secure computer systems to an off-the-shelf computer. An overview of the model is given. The paper includes a specification of the design that will be the basis for a rigorous proof of the correspondence between the model and the design. This design and implementation has demonstrated the technical feasibility of the security kernel approach for designing secure computer systems.

AD-A011 800/0GA PC$3.25/MF$2.25
Hawaii Univ Honolulu Dept of Information and Computer Science
Optimal Control of Demand-Paging Systems,
Art Let. 1975, 8p ARO-8803.15-EL
Grant DA-ARO-D-31-124-71-G43

Descriptors: *Memory devices, *Control theory, Dynamic programming, Mathematical models, Algorithms, Theorems.
Identifiers: *Paging, Virtual memory, Computer storage management, Stochastic control.

Demand-paging systems are characterized as stochastic control processes, and optimal page replacement decisions are determined by means of dynamic programming. This approach is distinguished from others by its use of page structure information, which may be either supplied a priori or else dynamically learned. The main result is an optimal realizable solution for a general class of replacement problems. The resulting algorithm subsumes others (including (A sub 0)) as special cases.

AD-A011 838/0GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Commenting Proofs.
Memorandum rept.,
James R. Geiser. May 74, 20p Rept no. AI-M-309
Contract N00014-70-A-0362-0003

Descriptors: *Computer programming, *Mathematical logic, *Syntax, Artificial intelligence, Semantics, Debugging(Computers), Recursive functions, Theorems, Meetings.
Identifiers: Axioms.

This paper constitutes a summary of a seminar entitled 'Commenting Proofs' given at the Artificial Intelligence Lab in the spring of 1974. The work is concerned with new syntactic structures in formal proofs which derive from their pragmatic and semantic aspects. It is a synthesis of elements from Yessenin-Volpin's foundational studies and developments in Artificial Intelligence concerned with commenting programs and the use of this idea in automatic debugging procedures.

AD-A011 922/2GA PC$7.00/MF$2.25
Informatics Inc Rockville Md
RADC Automatic Document Classification On-Line (RADCOL). Program Documentation.
Final rept. 22 Jun 73-31 Jan 75,
Peter Kurtz. May 75, 200p Rept no. TR-75-1594-1 RADC-TR-75-110-Vol-1
Contract F30602-73-C-0350
See also Volume 2, AD-A011 923.

Descriptors: *Computer programming, *Information retrieval, *On line systems, Information systems, Time sharing, Experimental design, Vocabulary, FORTRAN.
Identifiers: *RADCOL system.

This document is the final report on the effort devoted to completing an on-line information retrieval system for the Rome Air Development Center, Air Force Systems Command, Griffiss Air Force Base, Rome, New York. Volume I of this report contains a brief user's manual to enable interested persons to gain access to the on-line system. Two separate areas were covered in detail under this contract. The first area might be broadly termed performance enhancements but covers a wide range of topics both in the analysis and classification system and in the on-line portion. The other area deals with the matter of centent-stem updatability. This portion involved studies of the effect of document length on Dennis' measure, speculation on content-stem vocabulary, and design of a series of experiments in content-stem updatability. Also, a new stem-dictionary structure was designed and implemented.

AD-A011 923/0GA PC$3.75/MF$2.25
Informatics Inc Rockville Md
RADC Automatic Document Classification On-Line (RADCOL). User's Manual.
Final rept. 22 Jun 73-31 Jan 75,
Peter Kurtz. May 75, 31p Rept no. TR-75-1594-2 RADC-TR-75-110-Vol-2
Contract F30602-73-C-0350
See also Volume 1, AD-A011 922.

Descriptors: *Computer programming, *Information retrieval, *On line systems, Information systems, Time sharing, Instruction manuals.
Identifiers: *RADCOL system.

This report documents improvements made to the RADCOL automatic document analysis system and modifications to the on-line portion of RADCOL. A User's manual is included containing reference material and tutorial guidelines. Both the casual user and the serious experimenter will find instructive sections to aid their different but related purposes.

AD-A011 929/7GA PC$4.25/MF$2.25
Purdue Univ Lafayette Ind School of Electrical Engineering
Image Analysis and Modeling.
Quarterly progress rept. 1 Nov 74-31 Jan 75,
Paul A. Wintz, and T. S. Huang. May 75, 58p
Rept no. TR-EE75-3 RADC-TR-75-144
Contract F30602-75-C-0150, ARPA Order-2893

Descriptors: *Optical images, *Image processing, Optical tracking, Digital computers, Pattern recognition, Computer applications, Algorithms, Airborne, Satellite tracking systems.
Identifiers: Feature extraction, Image restoration, Spaceborne photography, ERTS satellites.

The objective of this research is to achieve a better understanding of image structure and to use this knowledge to develop improved image models for use in image analysis and processing tasks such as information extraction, image enhancement and restoration, coding, etc. The ultimate objective of this research is to form a basis for the development of technology relative to military applications of machine extraction of information from aircraft and satellite imagery of the earth's surface. Work reported here includes: image segmentation and decomposition, edge detection, texture analysis, clustering, feature extraction, coding and restoration.

AD-A012 020/4GA PC$4.75/MF$2.25
Texas Univ At Austin Electronics Research Center
A Module Interface Specification Language.
Technical rept.,
Robert F. Bridge, and Edward W. Thompson. 3 Dec 74, 81p Rept no. TR-163 AFOSR-TR-75-0868
Contract F44620-71-C-0091

Descriptors: *Programming languages, Computer programming, Specifications, Interfaces, Cost effectiveness, FORTRAN, Syntax.
Identifiers: BRIDGES system, Structured programming, Computer program reliability, ALGOL.

One particularly critical function in the development of a large software system is the specification, design, control, and documentation of communications between program modules. Problems in this area contribute significantly to the length of time needed for system tests, the difficulty of long-term maintenance, and the lack of system flexibility. Although the state-of-the-art of Software Engineering has made great strides these past few years, the area of intermodule communication is still lacking in engineering tools and methodologies. This technical report presents a recently developed language which can be used to specify, control, and document program intermodule communication. A system named 'BRIDGES' which processes the new specification language is also discussed.

AD-A012 196/2GA PC$3.25/MF$2.25
Rome Air Development Center Griffiss AFB N Y
Reliability Maintainability and Availability Analysis Tradeoff Tool (R and M Availability approaches a limit of 2, Trade off approaches a limit of 2).
Final rept.,
George Lyne. Jun 75, 23p Rept no. RADC-TR-75-149

Descriptors: *Computer programs, *Reliability, Trade off analyses, Maintainability, Fortran, Time sharing, Subroutines, Digital computers, Failure, Repair.
Identifiers: *Honeywell 645 computers, Fortran 4 programming language.

A computer program written in Honeywell Fortran for the Honeywell 645 Time-Sharing System, to model and calculate complex configuration/system reliability and maintainability values, a brief discussion of the reliability concepts utilized and examples of the program utilization/implementation is presented. (Author)

AD-A012 308/3GA PC$4.75/MF$2.25
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
An Analysis of Optimal Retrieval Systems with Updates.
Technical rept.,
Richard A. Flower. Jun 75, 72p Rept no. TR-488
Contract DAAB07-74-C-0630, Grant NSF-GK-37582

Descriptors: *Computer applications, *Information retrieval, Data storage systems, Data bases, Information systems, Mathematical logic, Algorithms, Performance.
Identifiers: Logic design, Data structures.

The performance of computer-implemented systems for data storage, retrieval, and update is investigated. A data structure is modeled by a set D = (d sub 1, d sub 2,...d sub/absolute value of D/) of data bases. A set of questions Lambda = (lambda sub 1, lambda sub 2,...,lambda sub n) about any d an element of D may be answered. A memory that is bit-addressable by an algorithm or an automaton models a computer. A retrieval system is composed of a particular mapping of data bases onto memory representations and a particular algorithm or automaton. By accessing bits of memory the algorithm can answer any lambda an element of Lambda about the d represented in memory and can update memory to represent a new d* an element of D. Lower bounds are derived for the performance measures of storage efficiency, retrieval efficiency, and update efficiency. The minima are simultaneously attainable by a retrieval system for some data structures of interest. trading relations between the measures exist for other data structures.

AD-A012 310/9GA PC$3.75/MF$2.25
TRW Systems Group Huntsville Ala
Advanced Simulation Center Data Processing System Performance Analysis.
Final technical rept.,
D. C. Hall, and R. G. Payne. Jun 75, 59p Rept no. TRW-27844-6921-001 RG-CR-75-3
Contract DAAH01-75-C-0423
See also report dated Dec 74, AD/A-003 589.

Descriptors: *Data processing, *Computerized simulation, Computations, Computer programming, Real time, Homing, Electronic warfare.
Identifiers: Performance evaluation, CDC 6600 computers.

Objectives for the current contractual activity were identical to those of the previous contract but were extended in scope and continued for each area, namely: Design verification of the model to assure that the transformation from model design requirements defined by top level logic control chains to detailed SALSIM logic control chains was correct; Preliminary validation of the model to test agreement between the behavior of the model and current information on the performance specifications of the ASC Interface being designed; and, Maintenance and training in the utilization of the model and the simulation language (SALSIM) used to implement the model. (Both the model and SALSIM were previously implemented by TRW Systems on the ASC's CDC 6600 and reside on the disc files of that system.)

AD-A012 393/5GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
A Note on the Computation of Binocular Disparity in a Symbolic, Low-Level Visual Processor,
David Marr. Dec 74, 21p Rept no. AI-M-327
Contract N00014-70-A-0362-0005

Descriptors: *Image processing, Stereoscopic display systems, Computer graphics, Scenes.
Identifiers: Visual processors, Symbolic visual processors, Scene analysis.

The goals of the computation that extracts disparity from pairs of pictures of a scene are defined, and the constraints imposed upon that computation by the three-dimensional structure of the world are shown to be inadequate. A precise expression of the goals of the computation is possible in a low-level symbolic visual processor: the constraints translate in this environment to pre-requisites on the binding of disparity values to low-level symbols. The outline of a method based on this is given.

AD-A012 397/6GA PC$3.25/MF$2.25
Sperry UNIVAC St Paul Minn Defense Systems Div
Fault Tolerance in Galois Trees: An Algorithm for Detection and Location of Stuck-at Type Errors in Trees of Galois Linear Modules.
Technical rept.,
J. M. Marver. Jun 75, 16p Rept no. PX-11292
Contract N00014-75-C-0675

Descriptors: *Computer programming, Algorithms.
Identifiers: *Fault tolerant computing, *Galois theory, Trees(Mathematics), Binary codes.

An algorithm detects and locates stuck-at type errors from the outputs of four-bit Galois linear modules arranged in a tree formation. An example is given describing the procedure in detail.

AD-A012 402/4GA PC$4.25/MF$2.25
Maryland Univ College Park Computer Science Center
Picture Processing.
Technical rept.,
Joan S. Weszka, and Azriel Rosenfeld. May 75, 51p Rept no. TR-378
Contract N00014-75-C-0286
See also report dated Jan 75, AD/A004 974.

Descriptors: *Pattern recognition, *Image processing, Pictures, Data processing, Radiology, Cytology, Particle beams, Automatic.
Identifiers: *Pictorial pattern recognition, Scene analysis, Edge detection, Remote sensing.

This paper reviews the fundamentals of automatic picture processing and scene analysis. It discusses computer-based methods of segmenting picutres into meaningful parts; determining properties of the parts and relationships among the parts; and using this information to construct descriptions of the pictures. The material is organized by principal areas of application, including document reading, high-energy physics, cytology, radiology, and remote sensing of the environment.

AD-A012 413/1GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Pricing and the Allocation of Data Processing Resources.
Master's thesis,
William Frank Habermann. Jun 75, 73p

Descriptors: *Data processing, *Management planning and control, *Investments, Costs, Allocations, Utilization, On line systems, Accounting, Budgets, Theses.
Identifiers: Prices, Resource allocation, Microeconomics, Expenses.

This thesis outlines the growing financial commitment by organizations to provide data processing services. The supply and demand characteristics of computers and microeconomics, pricing and accounting theories are reviewed in relation to resource allocation. The impact of no charge-back and charge-back policies on computer utilization are discussed in depth. Pricing goals--cost recovery and/or resource allocation, pricing principles and pricing structure--length of costing period, selecting resources to be priced and quality of service are also investigated in depth. Suggested resource utilization measures are included in the Appendices. The advantages and disadvantages of average cost, flat rate and flexible pricing charge-back techniques are critically examined. Several examples of charge-back techniques used by commercial, educational and military organizations are presented. A time phased implementation plan of a charge-back system, beginning with average cost followed by flexible pricing, is recommended. A bibliography is included.

COM-75-50393/8GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards, Washington, D.C.
Code Extension Techniques in 7 or 8 Bits.
Federal information processing standards.
1 Jun 75, 4p FIPS-PUB-35
Paper copy available from GPO as C13.52:35.

Descriptors: *Data processing, *National government, *Standards, Coding.
Identifiers: *Federal information processing standards.

This FIPS PUB announces the adoption of the American National Standard X3.41-1974, Code Extension Techniques for Use with the 7-Bit Coded Character Set of ASCII. This standard specifies methods of extending the 7-bit code of ASCII (FIPS 1), remaining in a 7-bit environment or increasing to an 8-bit environment, building upon the structure of ASCII to describe various means of extending the control and graphic sets of the code. It also describes techniques for constructing codes related to ASCII so as to allow application dependent usage without preventing the interchangeability of their data and describes 8-bit codes for general information interchange in which ASCII is a subset.

COM-75-50394/6GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards, Washington, D.C.
Graphic Representation of the Control Characters of ASCII (FIPS 1).
Federal information processing standards.
1 Jun 75, 4p FIPS-PUB-36
Paper copy available from GPO as C13.52:36.

Descriptors: *Data processing, *National government, *Standards, Display devices, Graphic methods.
Identifiers: *Federal information processing standards.

This FIPS PUB announces the adoption of the American National Standard X3.32-1973, Graphic Representation of the Control Characters of American National Standard Code for Information Interchange. This standard specifies graphical representations for the 34 characters of ASCII (FIPS 1) for which a graphic representation is not indicated in FIPS 1. Graphical representations are given for the 32 control functions of columns 0 and 1 as well as the characters 'Space' and 'Delete'. Two forms of graphical representations for each of the 34 characters are provided: a pictorial symbol, and a 2-letter alphanumeric code.

JPRS-64938 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Optical and Electrooptical Data Processing,
B. S. Sotskov. 6 Jun 75, 20p
Trans. of mono. Opticheskaya i Elektrooptricheskaya Obrabotka Informatsii, Moscow, 1974 p4-6, 66-75, 146-149.

Descriptors: *Data processing, Electrooptics, Optical equipment, Pattern recognition, Fiber optics, Data storage, Data transmission, Translations, USSR.
Identifiers: *Optical data processing.

The report contains materials of the Third All-Union Seminar on Optical and Electrooptical Ways and Means of Transmitting, Converting, Processing and Storing Information held in December 1971.

NTIS/PS-75/572/8GA PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Minicomputers (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
David W. Grooms. Jul 75, 263p*
Supersedes NTIS/PS-74/102.

Descriptors: *Bibliographies, *Minicomputers, Process control, Production control, Machine tools, Nuclear reactor control, Radiation measuring instruments, Guidance computers, Computer programming, Compilers, Cost analysis, Computation.
Identifiers: PDP computers.

The report cites research on the design and applications of minicomputers. A few of the areas of application include audio recorders, chemical analysis, radiation detection, process control, reactor control, production control, ocean sciences, and tracking systems. The report also cites the supporting software for solving the problems and processing the data in the many areas of application. (Contains 258 abstracts)

N75-24382/4GA PC$4.75/MF$2.25
Control Data Corp., Arden Hills, Minn. Aerospace Div.
Study of the Modifications Needed for Efficient Operation of Nastran on the Control Data Corporation Star-100 Computer.
1975, 85p NASA-CR-132644
Contract NAS1-12436
Subm-Prepared for Mcdonnell-Douglas Astronaut. Co.

Descriptors: *Cdc computers, *Machine-independent programs, *Structural analysis, Cost analysis, Feasibility analysis, Fortran, Input/output routines, Matrices (Mathematics), Vector analysis.

For abstract, see STAR 1315

N75-24383/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A Digital Algorithm for Spectral Deconvolution with Noise Filtering and Peak Picking: Noflpp-Decon.
T. R. Edwards, G. L. Settle, and R. D. Knight.
Feb 75, 41p NASA-TM-X-64927

Descriptors: *Algorithms, *Convolution integrals, *High pass filters, *Low pass filters, *Noise reduction, Computer programs, Data processing, Data smoothing, Man machine systems, Polarimeters, X ray apparatus.

For abstract, see STAR 1315

PAT-APPL-576 059/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Serpentine Charge-Coupled-Device Memory Circuit.
Patent Application,
Ronald A. Belt. Filed 9 May 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Memory devices, Patents, Charge coupled devices, Shift registers, Configurations.
Identifiers: *Patent applications, PAT-CL-307-251.

An improved serpentine charge-coupled-device memory circuit is provided in the patent application by alternately interleaving linear-shift registers of adjacent arrays, and placing non-refresh turn-around circuits in the CCD channel. This structure provides approximately twice the available space for the width of the refresh-turn circuitry over that of prior art devices so that better and more complex refresh-turn amplifiers and circuits may be used.

PATENT-3 886 337 Not available NTIS
Department of the Air Force Washington D C
Templates for Switch Setting in Computer Control.
Patent,
Kurt H. Haase. Filed 7 Nov 73, patented 27 May 75, 5p Rept nos. PAT-APPL-413 730,
Supersedes AD-164 687.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Templates, *Patents, Input output devices, Setting(Adjusting), Toggle switches, Control panels.
Identifiers: PAT-CL-200-46.

The patent relates to templates for simultaneously setting a number of toggle switches in a row such as during bootstrap loading of a computer. An elongated rectangular template having a series of teeth extending inwardly toward the computer panel is movable upward and downward with one end in slidable contact with a guide bar for positioning the template relative to the computer panel. Moving the template upward with the teeth under the handles sets a preselected group of switches to the IN position and, conversely, moving the template downward with the teeth above the handles sets the switches back to the 'reset' position.

PB-242 912/4GA PC$3.25/MF$2.25
Ohio State Univ., Columbus. Computer and Information Science Research Center.
Emulation of Computer Networks by Microprogrammable Microcomputers.
Technical rept.,
D. Cohen, and M. T. Liu. Jun 74, 24p OSU-CISRC-TR-74-4
Grants NSF-GN-534.1, NSF-GN-27458

Descriptors: *Microprogramming, Parallel processors, Semiconductor computer storage.
Identifiers: *Microprocessors, *Microcomputers, Large scale integrated circuits, INTEL 8080 computers, Computer networks.

The advent of low-cost, sophisticated, microprogrammable, LSI microprocessors has renewed interest in multiple-computer systems. This paper suggests a method of implementing microprogrammable microcomputer systems as a sophisticated tool (emulators) for decreasing the economical risk involved in development of a large computer network. Two levels of emulation are proposed for different networking configurations. The Intel 8080 microprocessors are selected for implementing

the systems described. As a special case where mutually exclusive data are processed, the proposed for different networking configurations. The Intel 8080 microprocessors are selected for implementing the systems described. As a special case where mutually exclusive data are processed, the proposed systems can be changed to parallel processing systems for parallel execution of computer programs at different levels.

9C. Electrical and Electronic Engineering

AD-A012 244/0GA PC$3.75/MF$2.25
Air Force Avionics Lab Wright-Patterson AFB Ohio
DAIS Hot Bench/Sensor Simulation Interface Design.
Interim technical rept. Dec 73-Sep 74,
Omer S. Keener, and Richard A. Wakefield. Apr 75, 47p Rept no. AFAL-TR-74-298

Descriptors: *Multiplexing, *Signal processing, *Interfaces, Digital systems, Avionics, Information systems, Test facilities, Real time, Simulation, Computer programs.
Identifiers: *Digital avionics information system, Direct memory access, DAIS(Digital avionics information system).

The Digital Avionics Information System (DAIS) Test Facility requires a real time simulation of avionic sensors that are to be replaceable by actual avionics hardware. These sensors will be simulated by software and converted into the appropriate signal formats for delivery to the DAIS Hot Bench which will be a mock-up of an avionics information system. This report describes the design and operation of the interface needed to link the simulation software with the Hot Bench hardware. Included in the report are descriptions of the hardware and software control of the interface and the type of signal processing required. (Author)

AD-A012 316/6GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
A Device for Damping a DC Electric Drive,
I. A. Voronetski. 10 Jan 75, 6p Rept no. FSTC-HT-23-0098-74
Trans. of Patent (USSR) 345 577 1972.

Descriptors: *Drives(Electronics), *Electric motors, *Damping, *Braking, Thyristors, Direct current, Converters, Patents, Translations, USSR.
Identifiers: Electric drives.

A device for damping a DC electric drive is proposed, which is characterized by the addition of a symmetrical thyristor connected in parallel to the motor armature. This reduces the period of the motor rotation by inertia, thereby achieving the desired low run-out feature, which is the purpose of the invention.

N75-23853/5GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Failure Analysis of Electronic Parts: Laboratory Methods.
R. J. Anstead, and E. Goldberg. 1975, 79p
NASA-SP-6508
Contract NAS5-21444
Subm-Prepared in Cooperation with Sperry Rand Corp., Clearwater, Fla.

Descriptors: *Destructive tests, *Electronic equipment tests, *Failure analysis, *Nondestructive tests, High temperature tests, Impact tests, Radiography, Reliability, Tolerances (Mechanics), Wear tests.

For abstract, see STAR 1315

9D. Information Theory

AD-A012 135/0GA PC$3.25/MF$2.25
California Univ Los Angeles Dept of Engineering Systems
Use of Isolated Forecasts in Markov Decision Processes with Imperfect Information,
D. M. Brooks, and C. T. Leondes. Feb 74, 9p
AFOSR-TR-75-0858
Grant AF-AFOSR-2166-72
Availability: Pub. in AIIE Transactions, v6 n3 p244-251 Sep 74.

Descriptors: *Information theory, *Markov processes, Sequential analysis, Dynamic programming, Decision theory, Iterations, Forecasting, Algorithms, Mathematical models, Reprints.
Identifiers: *Markov decision processes.

The Markov Decision Process formulation and its application to processes in which there is uncertainty as to process state, or imperfect state information, are reviewed. The question of how to determine an optimal action if some form of intelligence of forecast of the process state for a single process stage is posed. An expression for the expected return for each available action is developed, as a perturbation to the basic process. The optimal action and value of the forecast are obtained by combining a Policy Iteration solution of the imperfect information process and evaluation of the policies for the perturbed process based on these imperfect information process parameters. (Author)

AD-A012 194/7GA PC$3.25/MF$2.25
Princeton Univ N J
Numerical Results on the Convergence of Relative Efficiencies,
J. H. Miller, and J. B. Thomas. 28 Jan 74, 8p
ARO-7624.41-EL
Contract DAHC04-69-C-0012, Grant NSF-GK-24187
Availability: Pub. in IEEE Transactions on Aerospace and Electronic Systems, vAES-11 n2 p204-209 Mar 75.

Descriptors: *Information theory, *Convergence, *Detectors, Nonlinear systems, Sampling, Noise, Signal to noise ratio, Optimization, Efficiency, Threshold effects, Reprints.
Identifiers: *Nongaussian noise.

This paper considers the detection of a known constant signal in an additive non-Gaussian noise under the assumptions of discrete time and statistically independent noise samples. The objective is to determine how large sample size must be before the easily computed asymptotic relative efficiency becomes a valid measure of performance. The exact small-sample error probabilities are calculated for a Neyman-Pearson optimal nonlinear detector consisting of a zero-memory nonlinearity followed by summation and threshold comparison. 'Large-tailed' noise having a double exponential distribution is used as an example. The exact distribution of the test statistics for a linear detector and for the Neyman-Pearson optimal detector are calculated. Then the relative efficiency of the Neyman-Pearson optimal detector, as compared to a linear detector, is computed in order to study the rate of approach of the relative efficiency to its asymptotic value. (Author)

AD-A012 286/1GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Confidence Intervals for Regression (MEM) Spectral Estimates.
Technical note,
Arthur B. Baggeroer. 18 Jun 75, 46p Rept no. TN-1975-41 ESD-TR-75-208
Contract F19628-73-C-0002

Descriptors: *Signal processing, *Entropy, White noise, Spectrum analysis, Regression analysis, Confidence limits, Transfer functions, Estimates, Algorithms.
Identifiers: Maximum likelihood estimation, T test.

The probability density and confidence intervals for the 'Maximum Entropy (or regression) Method (MEM)' of spectral estimation are derived using a Wishart model for the estimated covariance. It is found that the density for the estimated transfer function of the regression filter may be interpreted as a generalization of the Student's t distribution. The scaling of the spectral estimate, which is the estimate of the prediction error, is statistically independent of the estimated transfer function and has a Chi square distribution. Confidence intervals are calculated for an example consisting of several closely spaced tones in a background of white noise. These intervals are compared with those for the Maximum Likelihood Method. Generalizations are introduced for frequency wave number spectral estimation and for the joint density at different frequencies.

9E. Subsystems

AD-A011 697/0GA PC$40.00/MF$40.00
IIT Research Inst Chicago Ill Reliability Analysis Center
Microcircuit Reliability Bibliography. Volume I-A. Cumulative Index. Volume III. 1975 Annual Reference Supplement (Document Numbers 10417--11044).
Apr 75, 300p Rept nos. RAC-MRB-0474-Vol-1A, RAC-MRB-0474-Vol-3
Contract F30602-73-C-0065
Revision of Volume 1 of AD-786 287.
Availability: Also available with Volume 2, AD-A011 698 as AD-A011 699, PC$50.00, MF$50.00.

Descriptors: *Microcircuits, *Reliability(Electronics), *Bibliographies, Microelectronics, Integrated circuits, Failure(Electronics), Test methods, Fabrication, Computer applications, Computerized simulation, Quality assurance, Hybrid circuits, Utilization.

The bibliography identifies selected literature pertinent to the reliability of microelectronic devices. This two-volume publication updates the bibliography which now consists of three volumes: IA, II and III. Volume IA contains a categorized subject term index, as well as corporate author and 1975 personal author indices. The indices cross-reference bibliographic citations presented in Volume II, Cumulative References, (previously issued) covering acquisitions through February 1974 and Volume III, 1975 Annual Reference supplement which includes acquisitions for the period March 1974 through February 1975. These reference volumes contain almost 3000 citations which were selected from the Reliability Analysis Center's file holdings. Citations include complete bibliographic information and descriptive abstracts. The complete Microcircuit Reliability Bibliography enables the engineer or technical librarian to perform retrospective information searches in a wide variety of pertinent subject areas.

AD-A011 698/8GA PC$15.00/MF$15.00
IIT Research Inst Chicago Ill Reliability Analysis Center
Microcircuit Reliability Bibliography. Volume II. Cumulative References.
Apr 74, 365p Rept no. RAC-MRB-0474-Vol-2
Contract F30602-73-C-0065
This report is identical with Volume 2 of AD-786 287.
Availability: Also available with Volume 1A and Volume 3, AD-A011 697, as AD-A011 699, PC$50.00, MF$50.00.

Descriptors: *Microcircuits, *Reliability(Electronics), *Bibliographies, Microelectronics, Integrated circuits, Failure(Electronics), Test methods, Fabrication, Computer applications, Computerized simulation, Quality assurance, Hybrid circuits, Utilization.

The bibliography identifies selected literature pertinent to the reliability of microelectronic devices. The complete bibliography is in two volumes. Volume I contains computer-prepared subject term and corporate author indices which cross reference to bibliographic references listed in Volume II. This volume contains over 2500 citations which are selected from the Reliability Analysis Center's file holdings. Citations include complete bibliographic information and descriptive abstracts. The two volumes, when used together, enable the engineer or technical librarian to perform retrospective information searches in a wide variety of pertinent subject areas.

AD-A011 699/6GA PC$50.00/MF$50.00
IIT Research Inst Chicago Ill Reliability Analysis Center
Microcircuit Reliability Bibliography. Volume I-A. Cumulative Index. Volume II. Cumulative References. Volume III. 1975 Annual Reference Supplement (Document Numbers - 10417--11044).
Apr 75, 653p Rept no. RAC-MRB-0474
Contract F30602-73-C-0065
Supersedes Volumes 1 and 2 dated Apr 74, AD-786 287. Includes AD-A011 697, AD-A011 698.
Availability: Volumes 1A and 3 available separately as AD-A011 697, PC$40.00/MF$40.00; Volume 2 available separately as AD-A011 698, PC$15.00/MF$15.00.

Descriptors: *Microcircuits, *Reliability(Electronics), *Bibliographies, Microelectronics, Integrated circuits, Failure(Electronics), Test methods, Fabrication, Computer applications, Computerized simulation, Quality assurance, Hybrid circuits, Utilization.
Identifiers: Design.

The bibliography identifies selected literature pertinent to the reliability of micro-electronic devices. This two-volume publication updates the bibliography which now consists of three volumes: IA, II and III. Volume IA contains a categorized subject term index, as well as corporate author and 1975 personal author indices. The indices cross-reference bibliographic citations presented in Volume II, Cumulative References (previously issued) covering acquisitions through February 1974, and Volume III, 1975 Annual Reference Supplement which includes acquisitions for the period March 1974 through February 1975. These reference volumes contain over 3000 citations which were selected from the Reliability Analysis Center's file holdings. Citations include complete bibliographic information and descriptive abstracts. The complete Microcircuit Reliability Bibliography enables the engineer or technical librarian to perform retrospective information searches in a wide variety of pertinent subject areas.

AD-A011 724/2GA PC$5.75/MF$2.25
Motorola Inc Scottsdale Ariz Government Electronics Div
Programmable Surface Wave Matched Filter.
Final technical rept. 12 Sep 73-26 Nov 74,
Arnold London, Fred Hickernell, Michael Adamo, and Charles Williams. May 75, 136p
RADC-TR-75-122
Contract F30602-74-0021

Descriptors: *Matched filters, Acoustic waves, Surface waves, Signal processing, Integrated circuits, Field effect transistors, Metal oxide semiconductors, Zinc compounds, Oxides, Piezoelectric transducers, Silicon, Coding, MOSFET semiconductors.
Identifiers: Metal oxide transistors, Zinc oxides, Acoustic surface waves.

A monolithic programmable surface wave matched filter was designed, fabricated and evaluated having a ROM controlled 31-bit Si-MOSFET biphase tap structure and a zinc oxide film layer transducer structure. Individual matched filter devices were capable of generating and correlating 31-bit PN sequences at a carrier frequency of 100 MHz with a 10 megabit/second rate. Two of the devices were incorporated in an encoder system with controlling logic circuitray which permitted contiguous signal generation by random selection of codes from the 6 x 31-bit read only memory of the device. A single device was used to correlate coded signals produced by a similar matched filter and a digitally generated signal. The device provides a high degree of signal processing integration on a single silicon chip measuring 770 by 75 mils.

AD-A011 791/1GA PC$3.25/MF$2.25
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Relationship Between Frequency Response and Settling Time of Operational Amplifiers,
B. Yeshwant Kamath, Robert G. Meyer, and Paul R. Gray. 13 May 74, 8p AFOSR-TR-75-0903
Contract F44620-71-C-0087
Availability: pub. in IEEE Jnl. of Solid-State Circuits, vSC-9 n6 p347-352 Dec 74.

Descriptors: *Operational amplifiers, Frequency response, Computerized simulation, Circuits, Time, Reprints.
Identifiers: Settling time.

The effects of pole-zero pairs (doublets) on the frequency response and settling time of operational amplifiers are explored using analytical techniques and computer simulation. It is shown that doublets which produce only minor changes in circuit frequency response can produce major changes in settling time. The importance of doublet spacing and frequency are examined. It is shown that settling time always improves as doublet spacing is reduced whereas the effect of doublet frequency is different for 0.1 and 0.01 percent error bands. Finally it is shown that simple analytical formulas can be used to estimate the influence of frequency doublets on amplifier settling time. (Author)

AD-A011 879/4GA PC$3.75/MF$2.25
Polytechnic Inst of New York Brooklyn Dept of Electrical Engineering and Electrophysics
Surface Ray Analysis of Conformal Arrays.
Final rept. 1 Apr 74-31 Mar 75, on Phase 2,
A. Hessel, J. Shmoys, and Z. W. Chang. May 75, 47p Rept no. POLY-EE/EP-75-149
Contract N00123-73-C-1481

Descriptors: *Antenna arrays, Conformal structures, Antenna radiation patterns, Ray tracing, Far field, Conical antennas, Beams(Radiation), Surfaces, Coupling(Interaction).

The presentation describes the progress in application of surface ray methods to analysis of radiation patterns and mutual coupling in arrays of aperture elements on convex conducting surfaces, with particular emphasis on conical arrays.

AD-A011 946/1GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Summary of Radiation Pattern Measurements Using the LES-7 Lens and Variable Power Dividing (VPD) Feed Network at 7.68 GHz.
Technical note,
Bing M. Potts. 25 May 75, 28p Rept no. TN-1975-37 ESD-TR-75-178
Contract F19628-73-C-0002
See also report dated 28 Jan 75, AD-A006 405.

Descriptors: *Multiple beam antennas, *Lens antennas, *Satellite antennas, *Antenna radiation patterns, Communication satellites, Beam forming, Antenna feeds, Power dividers, Microwave antennas, X band.
Identifiers: LES-7 satellite.

A comparison between experimental and calculated radiation pattern data for a multiple-beam antenna is presented. The antenna consists of a waveguide lens aperture excited by a 19-element feed horn array and variable beam-forming network. The pattern data presented varies from a narrow high-gain beam, equivalent to that of a steerable paraboloid, to the earth-coverage pattern of a wide coverage communication satellite. Also discussed are the results of the earth-coverage measurements when either one or two feeds are turned off so as to produce nulls in the earth-coverage pattern.

AD-A011 948/7GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Winding a Long Coil with a Pre-Programmed Turns Density Variation.
Technical note,
Michael L. Burrows, and S. Hardy Prince. 27 May 75, 22p Rept no. TN-1975-30 ESD-TR-75-176
Contract F19628-73-C-0002

Descriptors: *Submarine antennas, *Loop antennas, Towed bodies, Winding, Extremely low frequency, Taper, Density, Coils, Capacitance, Fabrication, Vibration.

A conventional cable manufacturer's concentric taping machine has been modified to wind a long solenoidal winding with a smooth pre-programmed turns density variation. An interpolating function generator with many adjustable set points is used to define the function of coil length that the turns density is to follow. A machine having this capability is needed to provide a towed ELF loop antenna with the smoothly tapered sensitivity variation it requires to discriminate against vibration noise.

AD-A011 980/0GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Capacitive Profile Tapering for Towed ELF Loop Antennas.
Technical note,
Michael L. Burrows. 27 May 75, 29p Rept no. TN-1975-27 ESD-TR-75-174
Contract F19628-73-C-0002

Descriptors: *Submarine antennas, *Loop antennas, Towed bodies, Capacitance, Taper, Extremely low frequency, Winding, Vibration.

A method of capacitive connection to the signal winding of a towed ELF loop antenna is proposed which achieves a smoothly tapered sensitivity profile using a series of strictly uniform and standard fabrication steps. Thus the expense, risk and waste involved in the non-uniform methods of core permeability tapering, core cross section tapering or turns density tapering can be avoided.

AD-A012 046/9GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Research Lab of Electronics
Analysis of Linear Digital Networks,
R. E. Crochiere, and A. V. Oppenheim. 15 Aug 74, 17p
Contract N00014-67-A-0204-0064, Grant NSF-GK-31353
Availability: Pub. in Proceedings of the IEEE, v63 n4 p581-595 Apr 75.

Descriptors: *Digital filters, *Networks, Linear systems, Signals, Flow charting, Matrices(Circuits), Reprints.

A framework is presented for the analysis, representation, and evaluation of digital filter structures. Based on the notation of linear signal-flow graphs and their equivalent matrix representation, a set of general linear digital network properties are reviewed, including precedence relations computability. Tellegen's theorem, interreciprocity, and newwork transposition. These preoperties are then utilized in developing time and frequency domain analysis techniques and sensitivity analysis techniques. These techniques, in turn, are applied to the comparison of several basic digital filter structures. (Author)

AD-A012 162/4GA PC$4.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Signal Processing by Parametric Interactions in an Acoustic Surface Wave Device.
Research and development technical rept.,
Emanuel Fliegler. May 75, 66p Rept no. ECOM-4312

Descriptors: *Signal processing, Parametric devices, Acoustic waves, Surface waves, Interactions, Fourier transformation, Matched filters, Correlators.
Identifiers: Acoustic surface waves, *Convolvers.

A tutorial study of the acoustic surface wave signal processor, also known as a convolver, is presented. Frequency conversion and time compression occur when an input signal is fed into one port of the device and a reference signal is fed into the other port of the device. The output from the third port is at the sum frequency, and is defined as the convolution or correlation function of the input signals. Several ways in which this device can be used for signal processing, particularly in performing correlation and Fourier transformation, are presented. Convolver theory is given, with best results shown for semiconductor devices. Experimental results given for the Fourier transformation processing, show a good relationship to theory, and prove that it is now possible to perform this function in real time with arbitrary waveshapes. The convolver can perform a large number of signal processing functions with one basic, three port, acoustic surface wave delay line configuration, a significant achievement in flexibility. Of greatest importance is the performance of these functions in real time.

AD-A012 166/5GA PC$4.25/MF$2.25
Army Electronics Command Fort Monmouth N J
The Susceptibilities of Electrical and Magnetic Antennas to Precipitation Static Noise (Experiments in an Electrostatic Wind Tunnel).
Final rept. Sep-Dec 74 on Phase 2,
Kurt Ikrath. May 75, 75p Rept no. ECOM-4319

Descriptors: *Aircraft antennas, *Precipitation static, Radiofrequency interference, Wind tunnel tests, Ice clouds, Snow clouds, Performance(Engineering).

The effects of precipitation static noise interference with the reception of radio-navigation and communications signals on aircraft flying through ice and snow clouds were generated with an electrostatic wind tunnel. Electrical type antennas, that is metal-rod and blade antennas, were found to be highly susceptible to precipitation static noise fields. Magnetic type ferrite loopstick antennas were found to be practically immune to these noise fields, if electrically conductive materials, such as wet or moist plastics or metal, were kept approximately 30 cm away from the antennas. This critical distance was reduced to 10 cm in the case of Crossed Ferrite Loopsticks.

AD-A012 197/0GA PC$3.75/MF$2.25
Rome Air Development Center Griffiss AFB N Y
Considerations in Microcircuit Visual Inspection,
Clyde H. Lane. Jun 75, 40p Rept no. RADC-TR-75-150

Descriptors: *Microcircuits, *Integrated circuits, *Visual inspection, Human factors engineering, Quality control, Defects(Materials), Magnification, Microscopes, Effectiveness.

Microcircuit visual inspection is examined primarily from a human factor standpoint. This is essentially a summary of many papers having a direct or indirect bearing on the subject. A brief description is given of the equipment used, relative to the parameters of greatest concern. Effects of complexity, defect rate, magnification, visual angle of the defect, contrast and vigilance on inspection accuracy are discussed. Finally, inspection effectiveness is discussed and a model developed by researchers at Sandia Laboratories is given. (Author)

AD-A012 287/9GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Strain-Gage Vibration Measurements on a Submarine-Towed Antenna Cable.
Technical note,
Michael L. Burrows. 27 May 75, 64p Rept no. TN-1975-22 ESD-TR-75-177
Contract F19628-73-C-0002
See also report dated 30 Mar 72, AD-744 825.

Descriptors: *Submarine antennas, Towed bodies, Extremely low frequency, Antenna components, Electric cables, Strain gages, Vibration, Measurement.

As part of the developmental work on a submarine-towed ELF loop antenna, the mechanics of cable vibration have been studied analytically and cable vibration measurements with accelerometets and strain-gages have been carried out from surfaces vessels and from a submarine. The results are that both cable longitudinal strain and cable curvature, over the frequency range of 20 to 200 Hz, are excited by the fluctuating forces on the surface of the cable arising from the cable's own turbulent boundary layer. Neither vibration of the tow point nor the submarine wake are significant sources of mechanical energy. Generalized force spectra are derived from the measured vibration spectra. These then allow the levels of both types of vibration to be calculated for an arbitrary cable towed at an arbitrary speed.

AD-A012 288/7GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Measured Characteristics of Variable Power Dividers.
Technical note,
Lorne K. DeSize. 27 May 75, 27p Rept no. TN-1975-38 ESD-TR-75-179
Contract F19628-73-C-0002
See also report dated 28 Jan 75, AD/A-006 405.

Descriptors: *Multiple beam antennas, *Power dividers, *Satellite antennas, Communication satellites, Antenna radiation patterns, Beam forming, Phase shift circuits, Variables, Ferrites.

A multiple-beam antenna system for Defense Satellite Communication System satellites offers an increased flexibility in controlling pattern shape for the suppression of interfering signals as well as providing narrow high-gain beams. One method of controlling the patterns of such an antenna system is to use a beamforming network consisting of variable power dividers which are electronically controlled. It is then of interest to determine the characteristics of these power dividers. This note presents some measured characteristics of a particular variable power divider that uses non-reciprocal, latching, ferrite phase shifters to obtain electronic control of the amplitude at each of the beam ports of a multiple-beam antenna system.

AD-A012 294/5GA PC$4.75/MF$2.25
Westinghouse Research Labs Pittsburgh Pa
Flat Panel Display.
Final rept. 1 May 72-23 Feb 73,
T. P. Brody, D. H. Davies, F. C. Luo, E. W. Greeneich, and G. D. Dixon. Nov 74, 98p AFAL-TR-74-301
Contract F33615-72-C-2013

Descriptors: *Display systems, Liquid crystals, Panels, Alignment, Field effect transistors, Thin films.
Identifiers: *Liquid crystal display systems, *Flat panel displays.

A 100 x 100 element, 6-inch square, liquid crystal (LC) display was developed that is capable of presenting alphanumeric and graphical information. The display is operated in the transmissive mode using twisted nematic LC material. An alignment technique was devised that yielded excellent homogeneous alignment of the LC material over the whole 6 x 6 inch area. The problem of electrically addressing the individual elements was solved using a thin-film, field-effect transistor (TFT) at each X-Y junction. The individual TFT devices exhibited excellent electrical properties and the TFT array was largely free of defects and crosstalk. An electronic exerciser was constructed to test the operation of the panel at TV rates. Although the slow response time of the twisted nematic LC material precluded video imaging, high-quality alphanumeric displays were demonstrated with good contrast and legibility.

AD-A012 358/8GA PC$3.75/MF$2.25
Texas Instruments Inc Dallas Central Research Labs
Tunable Filters Using Charge Transfer Devices.
Interim rept. no. 3, 16 Jul 74-16 Mar 75,
D. D. Buss, and C. R. Hewes. Jun 75, 39p Rept no. TI-08-75-17 ECOM-73-0266-3
Contract DAAB07-73-C-0266
See also report dated Oct 74, AD/A000 846.

Descriptors: *Band pass filters, *Charge coupled devices, Tuning, Charge transfer, Integrated circuits, Amplifiers, Clocks.
Identifiers: Design, Tunable filters.

An integrated (CCD) charge coupled device bandpass transversal filter has been designed. The CCD has 800 stages and is mask programmed to a tunable narrowband bandpass filter response with a 3 dB bandwidth of about 0.37% of center frequency. The tuning range is 50 Hz to 500 kHz. The self-contained device is designed for operational simplicity, requiring only dc voltages and one master clock in addition to the input and output signals. This report describes the design of the complete integrated circuit, which consists of the following sections: (1) the CCD; (2) a low noise, charge coupled input amplifier; (3) a low noise, differential, charge coupled output amplifier; (4) a clock waveform generator; and (5) clock line drivers. An analysis of theoretical noise performance predicts a 76 dB dynamic range and a minimum input level of 30 microvolts.

JPRS-64786 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.

Optimization of the Elements of Superhigh Frequency Range Antenna Feeder Devices,
A. L. Aginskii. 19 May 75, 9p
Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Radiotekhnika (USSR) v18 n2 p3-7 1973.

Descriptors: *Antenna feeds, Superhigh frequencies, Design, Optimization, Translations, USSR.

The report contains a discussion of methods used for the optimal design of long feeder channels, the selection of tolerances for making helical antennas, and so forth.

JPRS-64823 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Principles of Construction and Possibilities of Miniaturizing Low Frequency Selective Circuits,
N. V. Gordienko, D. S. Kazmiruk, L. A. Kiselev, and M. Z. Chapovskii. 21 May 75, 14p
Trans. of Sudostroenie (USSR) n2 p52-56 1972.

Descriptors: *Radiofrequency filters, Low frequencies, Miniaturization, Design, Translations, USSR.

The report contains data of the theoretical and experimental investigations on developing principles for the design of active RC filters, and the creation of engineering methods for their design and calculation.

N75-23848/5GA PC$3.25/MF$2.25
Westinghouse Defense and Electronic Systems Center, Baltimore, Md. Systems Development Div.
The 12 Ghz Image and Sum Enhanced Mixer Diode Converter.
Final Report, Aug. 1972 - Aug. 1973.
J. E. Degenford, and B. A. Newman. Oct 73, 23p
NASA-CR-143792
Contract NAS5-21845

Descriptors: *Diodes, *Image converters, *Image enhancement, Equipment specifications, Intermodulation, Mixing circuits.

For abstract, see STAR 1315

N75-23849/3GA PC$4.75/MF$2.25
District of Columbia Teachers College, Washington, D.C.
Investigation of Problems Associated with Solid Encapsulation of High Voltage Electronic Assemblies; Also Reynolds Connector Study.
Final Technical Report, 15 Apr. 1974 - 15 Apr. 1975.
R. S. Bever. 15 Apr 75, 92p NASA-CR-142803
Contract NGR-09-053-003

Descriptors: *Electric connectors, *Electronic packaging, *Encapsulating, *High voltages, Adhesion tests, Electric corona, Electrical faults, Permeability, Vacuum tests.

For abstract, see STAR 1315

PAT-APPL-566 156/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
A System for Intermodulation Product Cancellation.
Patent Application,
John E. Erickson. Filed 8 Apr 75, 6p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Intermodulation, Patents, Cancellation, Nonlinear systems, Communication and radio systems.
Identifiers: *Patent applications, PAT-CL-333-12.

The patent application relates to a system for intermodulation product cancellation provided by configuring two intermodulation product generating nonlinear devices with two 90 degree hybrids such that some intermodulation products that are generated by the two nonlinear devices will be combined by the 90 degree hybrid in such a way that the intermodulation products are 180 degrees out of phase and cancel each other.

PAT-APPL-567 893/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Equipment Self-Repair by Adaptive Multifunction Modules.
Patent Application,
James Saporito. Filed 14 Apr 75, 12p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Reliability(Electronics), *Redundant components, *Modules(Electronics), Logic circuits, Patents, Repair, Self operation, Adaptive systems.
Identifiers: *Patent applications, PAT-CL-340-146-1-B.

The patent application describes an equipment self repair apparatus using the substitution of redundant circuits for a failure in any original operating logic module. The substitution is accomplished through the use of a multiplexer unit which disconnects the faulty circuit and switches a built-in spare in its place.

PAT-APPL-570 063/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Pulse Control Apparatus for Plasma Display Selection.
Patent Application,
Richard A. Strom. Filed 21 Apr 75, 8p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Display systems, Patents, Plasmas(Physics), Plasma devices, Selection, Pulses, Control systems, Matrices(Circuits).
Identifiers: *Plasma display panels, *Patent applications.

The patent application describes pulse apparatus for controlling the selection pulse in a plasma electrode selection matrix wherein a driver receiving a voltage from supply V sub w is turned on to charge capacitor C through resistor R. At time T, when the voltage has essentially reached V sub w the driver is turned off, and a diode clamp is turned on returning the voltage rapidly to zero. In a modification, an additional diode and voltage supply V sub w are added at the output of the diode clamp. The driver is connected to voltage supply V sub c that is about fifty percent higher than the voltage supply V sub w. When the capacitor voltage reaches V sub w, the diode connected to V sub w conducts and clips the pulse amplitude so that it does not exceed V sub w. The driver is then turned off and the clamp is turned on to return the voltage to zero.

PAT-APPL-570 065/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Resolver-to-Digital Converter.
Patent Application,
Robert M. Kay. Filed 21 Apr 75, 17p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Signal processing, *Converters, Patents, Phase locked systems.
Identifiers: *Resolver to digital converters, *Patent applications, PAT-CL-235-154.

The patent application describes a resolver-to-digital converter where a signal of predetermined frequency is converted to a given waveform sequence by a logic circuit, band passed filtered, and phase splitted into orthogonal components. These components are fed to operational amplifiers and then into the input windings of a resolver. The outputs of the resolver are fed to a pair of zero crossing differential comparators and then to phase detectors, the outputs of which are summed. The sum of the signal is filtered and is used to regulate a voltage controlled oscillator that pulses a synchronous counter that is fed back to the phase detectors forming a phase-locked loop. The synchronous counter feeds a serial register that is strobed by the output of a zero crossing differential amplifier fed by the compensation windings of the resolver.

PAT-APPL-570 975/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Hybrid Sample Data Filter.
Patent Application,
Lewis E. Franks. Filed 22 Apr 75, 12p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Filters, Patents, Signal processing, Hybrid systems, Delta modulation, Shift registers, Flip flop circuits, Demodulators.
Identifiers: *Patent application, PAT-CL-332-11-D.

The patent application describes a sample data filter using a delta modulator to feed a shift register of which selected outputs are pulsewidth weighted. Each of the coefficient multipliers include a flip-flop fed by one of the taps of the shift register and triggered by a clock. A synchronous counter, common to each of the multipliers, is fed to a NAND gate that clears the flip-flop. Interposed between the counter and the NAND gate are a series of switches, one for each stage of the counter. The flip-flop controls a switch to a source of reference voltage and the output of this switch controlled voltage from each of the multipliers is summed and fed to a demodulator.

PAT-APPL-570 987/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Time Multiplexing Hybrid Sample Data Filter.
Patent Application,
Lewis E. Franks. Filed 22 Apr 75, 12p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Filters, Patents, Signal processing, Delta modulation, Time division multiplexing, Shift registers, Hybrid systems, Gates(Circuits).
Identifiers: *Patent applications, PAT-CL-332-11-D.

The patent application describes a hybrid sample data filter system using quantized data of an analog signal obtained from a delta modulator. A shift register having N preselected taps is fed by the delta modulator. Each of the N taps are fed to a series of AND gates corresponding to the R stages of a coefficient counter and between the stages of the coefficient counter and the AND gates are coefficient setting switches set in accordance with the predetermined weighting of the output taps of the shift register. A ring counter having N stages is also fed to the AND gates for time multiplexing with each of the stages of the ring counter feeding those AND gates that are fed by the corresponding tap of the shift register. Each of the AND gates fed by the same stage of the R stage coefficient counter is combined in one of a series of N-input OR gates, the output of which is fed to a R-input digital-to-analog converter. A demodulating filter is then connected to the output of the digital-to-analog filter.

PAT-APPL-577 972/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Low Height VLF Antenna System.
Patent Application,

H. A. Ray. Filed 15 May 75, 9p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Antennas, Patents, Very low frequency, Efficiency.
Identifiers: PAT-CL-343-843, *Patent applications.

The patent application relates to a low height, high efficiency antenna system in which a plurality of radiating elements are spaced to induce mutual radiation resistance in each other. The elements radiate, using constant current which is obtained with a parallel folded element that receives the current prior to the radiating element. As the current is moving in opposite directions in the folded element, all but the constant current component is cancelled. The edge of the supporting tower can be used as one or two legs of the folded element.

9F. Telemetry

E75-10295 PC$3.25/MF$2.25
Environmental Research Inst. of Michigan, Ann Arbor.
Developing Processing Techniques for Skylab Data.
Monthly progress rept.,
Richard F. Nalepka, and William A. Mailia. 21 May 75, 13p ERIM-101900-55-L NASA-CR-142839
Contract NAS9-13280

Descriptors: Multispectral band scanners, Michigan, Spectral signatures, Vegetation, Land use, EREP, Skylab program, Resolution.

The author has identified the following significant results. An analysis of the conic data was completed for the spatial misregistration study. The effects of misregistration on classification and acreage estimation accuracy are being studied. Signatures were extracted for the primary ground covers in the test area.

N75-23672/9GA PC$4.25/MF$2.25
Raytheon Co., Sudbury, Mass. Equipment Development Lab.
Space Vehicle Viterbi Decoder.
Final Report.
16 Apr 75, 64p NASA-CR-141787, ER75-4176
Contract NAS9-13923

Descriptors: *Algorithms, *Data converters, *Decoders, Data transmission, Digital data, Synchronism.

For abstract, see STAR 1315

10. ENERGY CONVERSION (NON-PROPULSIVE)

10A. Conversion Techniques

COM-75-10786/4GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Office of Building Standards and Codes Services.
Emergency Workshop on Energy Conservation in Buildings. National Conference of States on Building Codes and Standards and National Bureau of Standards Joint Emergency Workshop on Energy Conservation in Buildings Held at the U.S. Department of Commerce, Washington, D.C. on June 19, 1973.
Final rept.,
Sandra A. Berry. Jul 75, 34p NBS-TN-789-1
Paper copy also available from GPO as C13.46:789-1.

Descriptors: *Energy conservation, *Meetings, *Buildings, Building codes, Design standards, Space heating.

This report contains the non-technical presentations given at the National Conference of States on Building Codes and Standards/National Bureau of Standards Joint Emergency Workshop on Energy Conservation in Buildings. Presentations included are those of other federal agencies, states, technical societies and industry organizations.

N75-23683/6GA PC$7.00/MF$2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Feasibility Study of a Satellite Solar Power Station.
Final Report.
P. E. Glaser, O. E. Maynard, J. J. R. Mackovciak, and E. I. Ralph. Feb 74, 199p NASA-CR-2357, ADL-C-74830
Contract NAS3-16804

Descriptors: *Energy policy, *Satellite solar power stations, *Solar cells, Dynamic structural analysis, Flight control, Radio frequency interference, Satellite solar energy conversion.

For abstract, see STAR 1315

N75-24094/5GA PC$4.00
National Aeronautics and Space Administration, Washington, D.C.
Energy: A Continuing Bibliography with Indexes, February 1975.
Feb 75, 260p NASA-SP-7043(03)

Descriptors: *Bibliographies, *Energy conversion, *Energy policy, *Solar energy, Energy storage, Hydrogen-based energy, Indexes (Documentation).

For abstract, see STAR 1315

N75-24099/4GA PC$3.25/MF$2.25
Little (Arthur D.), Inc., Cambridge, Mass.
Space Satellite Power System.
P. E. Glaser. 28 Mar 74, 24p NASA-CR-142799
Subm-Sponsored by NASA. Conf-Presented at the Solar Energy Lecture 3, Washington, D. C., Mar.-May 1974; Sponsored by IEEE, Washington Acad. Of Sci., and Washington Soc. Of Eng.

Descriptors: *Energy policy, *Photovoltaic cells, *Solar cells, *Solar energy conversion, Solar generators, Systems engineering.

For abstract, see STAR 1315

PB-241 665/9GA PC$8.50/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Data Policy.
Proceedings of the National Energy Data Workshop Held at Purdue University on October 30-31, 1974.
Apr 75, 261p FEA/C-75/211R

Descriptors: *Meetings, *Energy, *Government policies, Crude oil, Coal, Natural gas, Information systems, Data processing, Planning, Federal government, State government.
Identifiers: Contingency planning, Information exchange systems, Information transfer.

The proceedings of the National Energy Data Workshop covers the two day conference co-sponsored by the Federal Energy Administration and Purdue University. Presentations given at the conference by federal and state officials include; (1) Petroleum information systems; (2) Information for contingency planning; (3) Long range data programs; (4) FEA data programs in relation to the states; (5) Should the states be in the energy information business.

PB-242 160/0GA PC$3.25/MF$2.25
California Polytechnic State Univ., San Luis Obispo.
Research on the Application of Solar Energy to the Food Drying Industry.
Quarterly progress rept. no. 1, 1 Jan-31 Mar 75, Thomas Lukes. 31 Mar 75, 10p NSF/RA/N-75-032
Grant NSF-ERT74-19063
See also PB-238 073.

Descriptors: *Food processing, *Solar dryers, Dried foods, Drying, Dehydration, Crop driers, Water removal, Solar energy, Solar heating, Industries, Planning, Construction.

Very briefly summarized are procurement of materials and construction of a unit for drying various fruits and vegetables using combinations of solar energy and steam.

PB-242 474/5GA PC$4.75/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Resource Development.
Electricity Rates and the Energy Crisis. A Conference Report.
Aug 74, 84p FEA/G-75/96
Report on the FEA-Sponsored Electricity Rate Conference, Washington, D.C. 19 Jun 74.

Descriptors: *Electric utilities, *Electricity, *Energy conservation, *Meetings, Rates(Costs), Economic analysis, Financing, Electric power demand, Supply(Economics), Demand(Economics), Prices, Policies.

This report discusses economic problems in the electrical utilities industry--problems so important that the Federal Energy Administration is holding a series of conferences to discuss their solution. The papers contained in this volume represent a consensus at the first conference, held on June 19, 1974. Discussion centered on improvements in electrical utility rate structures to improve consumer equity, promote energy conservation, and provide revenues necessary for continued expansion of services.

PB-242 493/5GA PC$3.75/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Resource Development.
The Utility Oil Savings Study.
Final rept.
Jan 75, 36p FEA/G-75/255

Descriptors: *Energy conservation, *Electric utilities, *Fuel consumption, Fuel oil, Coal, Nuclear electric power generation, Benefit cost analysis, Fixed investment, Savings, Forecasting.
Identifiers: *Fuel substitution.

This report includes an analysis of five measures to save oil in the utility sector and identifies the oil savings, associated costs, and constraints under alternative policy options. Particular emphasis is accorded to measuring the impact on the oil savings objective of those initiatives proposed by the President in the State of the Union Message.

PB-242 944/7GA PC$4.75/MF$2.25
Resource Planning Associates, Cambridge, Mass.
Energy Supply/Demand Alternatives for the Appalachian Region. Executive Summary.
Final rept. Mar-Dec 74.
Mar 75, 90p* RA-74-18 EQ-4AC-022
Prepared in cooperation with Appalachian Regional Commission, Washington, D.C., Council on Environmental Quality, Washington, D.C., and National Science Foundation, Washington, D.C.

Descriptors: *Regional planning, *Energy policy, *Government policies, Energy demand, Fuel consumption, Electric power demand, Coal, Natural gas, Electricity, Industries, Residential buildings, Commercial buildings,

Transportation, Land use, Environmental impacts, Economic analysis, Marketing, Computerized simulation, Social effect, Scenarios, Models, Forecasting, National government.
Identifiers: *Appalachian region(United States).

The report is presented in two parts: (1) A description of the develoment of an analytic methodology, emphasizing the way it was used to estimate regional energy supply/demand balances and impacts; and (2) The findings and policy implications for the Appalachian Region resulting from the analysis of seven national energy scenarios. The most important effects analyzed included end-use consumption patterns; required energy sources (especially coal) and conversion facilities; and economic, social, and environmental impacts on Appalachia and its subregions.

10B. Power Sources

AD-A012 011/3GA PC$3.75/MF$2.25
Texas Tech Univ Lubbock Dept of Electrical Engineering
Airborne Power Systems Analysis.
Final rept. 15 Feb-15 Aug 74,
Tommy R. Burkes. Jun 75, 45p AFWL-TR-74-251
Contract F29601-74-C-0045

Descriptors: *Power supplies, Airborne, Pulse generators, Power, Pulses, Aircraft equipment, Systems analysis, Military requirements.
Identifiers: Power conditioning circuits.

The generation of high power, high voltage pulses in an airplane present several problems which must be simultaneously resolved. For example, electrical source voltage must be evaluated and selected in light of the pulsing scheme, source characteristics and the flight environment (high altitudes). Weight and volume of a pulser system are the major considerations but complexity, reliability, EMI and safety are also very important factors that must be considered. This report evaluates the near term applicability of several candidate power sources and pulse generation schemes for use in an aircraft. The analysis is made from system considerations and interfaces are defined. It is concluded that a turbo-alternator operating in resonance with the energy storage capacitors of several pulse forming networks will best meet present Air Force requirements.

AD-A012 283/8GA PC$3.25/MF$2.25
Universal Oil Products Co des Plaines Ill
Carbonaceous Catalysts for H3PO4 Fuel Cells.
Interim rept. no. 1, Aug 74-Feb 75,
L. B. Welsh, G. L. Hervert, D. H. Spielberg, and K. J. Youtsey. Mar 75, 53p
Contract DAAK02-75-C-0011

Descriptors: *Electrocatalysts, Polarization, Electrodes, Phosphoric acids, Composite materials, Fuel cells, Platinum, Substrates.
Identifiers: *Fuel cell catalysts, *Fuel cell electrodes.

UOP Kocite(R) materials are being evaluated as low cost air and/or fuel electrocatalysts in phosphoric acid electrolyte fuel cells. Kocite(R) materials are composite structures consisting of pyropolymers chemically bonded to refractory substrates. Fuel cell electrodes are fabricated and tested as anodes or cathodes in model fuel cells with conventional Pt fuel electrodes as counter electrodes. The performance of Kocite(R) materials as electrocatalysts has been studied. The second part of the program is directed toward evaluating the performance of Kocite(R) materials as platinum catalyst supports. Results to date indicate promising fuel cell performance at unusually low platinum loadings.

AD-A012 284/6GA PC$3.25/MF$2.25
Energy Research Corp Danbury Conn
New Materials for Fluoro Sulfonic Acid Electrolyte Fuel Cells.
Semi-annual rept. 7 Oct 74-7 Mar 75,
Michael George, and Bernard S. Baker. Jun 75, 18p Rept no. ERC-0123-S
Contract DAAK02-75-C-0045

Descriptors: *Fuel cells, Electrolytes, Sulfonic acids, Performance(Engineering), Pressure.
Identifiers: Hydrocarbon air fuel cells, *Fuel cell electrolytes, *Methane sulfonic acid/trifluoro.

Trifluoromethane sulfonic acid monohydrate (TFMSA-H2O), was evaluated as an electrolyte for matrix type fuel cells using conventional Teflon bonded platinum black electrodes. Pressure compensation was used to overcome the unique wetting characteristics of the acid. Limited test data was obtained at 200F that showed the TFMSA-H2O was superior to phosphoric acid at low current densities. Difficulties were encountered in preventing cross gas leakage during cell test caused both by matrix degradation and vaporization of free acid.

JPRS-64974 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Research in Magnetohydrodynamics,
V. I. Glukhikh. 11 Jun 75, 25p
Trans. of Magnitnaya Gidrodinamika (USSR) n1 p102-117 1975.

Descriptors: *Magnetohydrodynamic generators, *Magnetohydrodynamics, Translations, USSR.

The report contains the results of research and experience in the design of MHD machines with a liquid metal operating element and a review of research, conducted in Donetsk, on applied magnetohydrodynamics.

N75-23668/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Effect of Electron Irradiation in Vacuum on Fep-a Silicon Solar Cell Covers.
S. J. Marsik, and J. D. Broder. 1975, 10p NASA-TM-X-71713, E-8333
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Electron irradiation, *Ethylene, *Fluorination, *Propylene, *Solar cells, Electromagnetic wave filters, Embrittlement, Light transmission, Short circuits, Space environment simulation, Vacuum chambers.

For abstract, see STAR 1315

N75-23678/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Electric Power for Space Satellites.
C. M. Mackenzie. 4 Apr 74, 32p NASA-TM-X-66808
Conf-Presented at the Solar Energy Lecture 4, Washington, D. C., Mar. - May 1974; Sponsored by IEEE, Washington Acad. Of Sci., and Washington Soc. Of Eng.

Descriptors: *Conferences, *Electric generators, *Solar energy, Cost analysis, Energy policy, Photovoltaic cells, Satellites, Solar cells, Solar generators.

For abstract, see STAR 1315

N75-23681/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Summary of High Efficiency Silicon Solar Cell Meeting Held at NASA-Lewis.
D. T. Bernatowicz. 1975, 4p NASA-TM-X-71729, E-8353
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, 6-8 May 1975; Sponsored by the Inst. Of Elec. And Electron. Engr.

Descriptors: *Aerospace environments, *Efficiency, *Solar cells, Cost analysis, Product development, Radiation effects.

For abstract, see STAR 1315

N75-23851/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Efficiency and Weight of Voltage Multiplier Type Ultra Lightweight DC-DC Converters.
W. T. Harrigill, Jr., and I. T. Myers. 1975, 10p NASA-TM-X-71735, E-8321
Conf-Presented at Power Electron. Spec. Conf., Culver City, Calif., 9-11 Jun. 1975; Sponsored by IEEE.

Descriptors: *Direct power generators, *Multipliers, *Power efficiency, Capacitors, Diodes, Transmission loss.

For abstract, see STAR 1315

N75-23852/7GA PC$6.25/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Spacecraft High-Voltage Power Supply Construction.
J. F. Sutton, and J. E. Stern. Apr 75, 161p NASA-TN-D-7948, G-7448

Descriptors: *High voltages, *Power supply circuits, Design analysis, Electric corona, Electrical faults, Encapsulating, Gas discharges, Spacecraft components.

For abstract, see STAR 1315

N75-23989/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Survey of Coatings for Solar Collectors.
G. E. Mcdonald. 1974, 5p NASA-TM-X-71730, E-8355
Conf-Presented at the Workshop on Solar Collectors for Heating and Cooling of Buildings, New York, 21-23 Nov. 1974; Sponsored by NSF.

Descriptors: *Ceramic coatings, *Chromium, *Enamels, *Solar collectors, Copper, Cost analysis, Nickel coatings, Reflectance, Tables (Data), Zinc coatings.

For abstract, see STAR 1315

N75-24034/1GA PC$3.75/MF$2.25
Communications Research Centre, Ottawa (Ontario). Space Technology Branch.
A Structural Dynamics Model for Flexible Solar Arrays of the Communications Technology Satellite.
F. Vigneron. Apr 75, 37p CRC-1268

Descriptors: *Communications technology satellite, *Dynamic structural analysis, *Mathematical models, *Solar arrays, Continuum mechanics, Equipment specifications, Finite element method, Ground tests, Kinetic energy, Potential energy.

For abstract, see STAR 1315

N75-24108/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

The High Intensity Solar Cell: Key to Low Cost Photovoltaic Power.
B. L. Sater, and C. Goradia. 1975, 12p NASA-TM-X-71718, E-8338
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975.

Descriptors: *Cost effectiveness, *Energy policy, *Photovoltaic cells, *Solar cells, Solar energy conversion, Solar generators.

For abstract, see STAR 1315

N75-24109/1GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
The Effect of Sunshine Testing on Terrestrial Solar Cell System Components.
A. F. Forestieri, and E. Anagnostou. 1975, 8p NASA-TM-X-71722
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Component reliability, *Energy policy, *Performance prediction, *Solar cells, Accelerated life tests, Life (Durability), Photovoltaic cells, Silicon.

For abstract, see STAR 1315

N75-24111/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Outdoor Flat-Plate Collector Performance Prediction from Solar Simulator Test Data.
F. F. Simon, and E. H. Buyco. 29 May 75, 17p NASA-TM-X-71707, E-8320
Conf-Presented at 10TH Thermal Phys. Conf., Denver, 27-29 May 1975; Sponsored by Aiaa.

Descriptors: *Solar collectors, *Solar simulators, Air conditioning, Performance prediction, Performance tests, Solar heating.

For abstract, see STAR 1315

N75-24112/5GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Advances in the Theory and Application of Bsf Cells.
J. Mandelkorn, and J. H. Lamneck. 8 May 75, 6p NASA-TM-X-71723, E-8344
Conf-Presented at 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Electrical resistivity, *Photovoltaic cells, *Solar cells, Fermi surfaces, P-n junctions, Performance tests, Short circuits, Temperature gradients.

For abstract, see STAR 1315

N75-24117/4GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Effects of High Doping Levels Silicon Solar Cell Performance.
M. P. Godlewski, H. W. Brandhorst, and C. R. Baraona. 1975, 8p NASA-TM-X-71728, E-8351
Conf-Presented at 11TH Photovoltaic Spec. Conf., Phoenix, 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Impurities, *Silicon, *Solar cells, Diffusion, Performance prediction, Semiconductor devices.

For abstract, see STAR 1315

N75-24118/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Standardized Solar Simulator Tests of Flat Plate Solar Collectors. 1: Soltex Collector with Two Transparent Covers.
F. Simon. May 75, 13p NASA-TM-X-71738, E-8362

Descriptors: *Energy policy, *Solar collectors, *Solar simulators, Cooling systems, Inlet flow, Solar heating.

For abstract, see STAR 1315

N75-24119/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
V-Grooved Silicon Solar Cells.
C. R. Baraona, and H. W. Brandhorst. 1975, 10p NASA-TM-X-71715, E-8336
Conf-Presented at 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Silicon, *Solar cells, *Solar energy, Etching, Solar collectors, Surface finishing.

For abstract, see STAR 1315

N75-24505/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Application of the MOS-C-V Technique to Determine Impurity Concentrations and Surface Parameters on the Diffused Face of Silicon Solar Cells.
I. Weinberg. 1975, 8p NASA-TM-X-71721, E-8307
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Metal oxide semiconductors, *Silicon, *Solar cells, *Surface stability, Coatings, Dielectrics.

For abstract, see STAR 1315

PB-242 152/7GA PC$5.25/MF$2.25
Massachusetts Univ., Amherst. Energy Alternatives Program.
Design and Off-Design Performance Analysis of Ocean Thermal Difference Power Plant Turbines,
R. J. Veenema, Jr., and L. L. Ambs. May 75, 120p NSF/RANN/SE/GI-34979/TR/75/5 NSF/RA/N-75-031
Grant NSF-GI-34979

Descriptors: *Axial flow turbines, *Solar sea power plants, *Electric power plants, Design, Rankine cycle, Performance evaluation, Offshore structures, Ammonia, Propane.

A procedure has been developed to determine the axial-flow turbine design that operates at the maximum attainable efficiency for the design specific speed. The procedure uses the results of Balje's optimization study and accounts for the Reynolds number variation of Balje's optimized parameters. The procedure has been used to study the variation of the design parameters of ammonia and propane OTDM turbines. A procedure has been developed to predict the off-design performance of turbines designed by the previously mentioned design procedure. The inlet state, mass flow and rotational speed have been varied to produce performance maps for a series of ammonia and propane OTDM tu bines.

PB-242 156/8GA PC$3.75/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa.
Major Electric Equipment Cost Figures for Solar Sea Power Plants.
Technical rept.,
Leo A. Finzi. 31 Oct 74, 49p* NSF/RANN/SE/GI-39114/TR/74/5 NSF/RA/N-74-201
Grant NSF-GI-39114

Descriptors: *Solar sea power plants, *Electric power plants, Offshore structures, Power equipment, Cost analysis, Expenses, Electric motors, Electric generators, Transformers.

In the report, cost figures for all major electric equipment required in a Solar Sea Power Plant are provided. These figures are based on actual manufacturers' data. In addition, the dependence of cost on speed, frequency and shaft orientation for rotating machines is derived. The Appendix to the report includes the rules of similitudes of transformers and electric machines so that performance and materials requirements for different ratings can be derived from a given design and rating.

PB-242 165/9GA PC$4.25/MF$2.25
Purdue Univ., Lafayette, Ind. School of Electrical Engineering.
Evaluation of the Two-Field Synchronous Machine to Improve Power System Security.
Final rept., 15 Aug 72-31 Dec 74,
P. C. Krause. 31 Dec 74, 60p NSF/RA/N-75-022
Grant NSF-GI-35140

Descriptors: *AC generators, Electric power generation, Stability, Excitation, Applications of mathematics.

In addition to the analysis and evaluation of the two-field synchronous machine, dynamic stability investigations and a new method of developing dynamic equivalents are given. Basically, this report is a collection of papers and reports which have been written on the results of the research. Also included is a description of a pump-storage system instability which was analyzed and corrected using results of this research.

PB-242 248/3GA PC$4.25/MF$2.25
Massachusetts Univ., Amherst. Energy Alternatives Program.
A Proposed Ocean Thermal Energy Conversion Systems Program Plan (The OTECS Plan),
William E. Hernoemus. Mar 75, 72p NSF/RANN/SE/GI-34979/TR/75/4 NSF/RA/N-75-030
Grant NSF-GI-34979

Descriptors: *Solar sea power plants, *Planning, Organization theory, Projects, Cost estimates, Government policies, National government, Feasibility, Nomenclature, Terminology.

A program plan for development and acquisition of significant Ocean Thermal Energy Conversion Systems (OTECS) is presented. Existing research results are to be reduced to one or more bidder's packages via a contract definition phase evolution of one year conducted from a new and appropriately staffed program management headquarters. A standardized nomenclature system for description of any OTECS is presented. A technical development plan derived from existing research results is presented in considerable detail. Finally, a program summary is presented.

PB-242 258/2GA PC$5.25/MF$2.25
Argonne National Lab., Ill.
Solar Energy Concentration.
Annual progress rept. 1 Jul-31 Dec 74.
31 Jan 75, 128p NSF/RANN/SE-AER-75-01065/PR/75/4 NSF/RA/N-75-024
Grant NSF-AER75-01065
Prepared in cooperation with Chicago Univ., Ill.

Descriptors: *Flat plate collectors, *Solar energy concentrators, Paraboles, Heat transfer, Heat loss, Thermal efficiency, Reflectivity, Energy absorption, Optical properties, Thermodynamic properties, Design, Mathematical models, Performance tests, Performance

evaluation, Computerized simulation, Computer programs.

A concentrating solar heater based on the compound parabolic design was constructed and tested. The principle characteristics of the collector are that it has a concentration factor = 3, and an angular acceptance (full angle) = 38 degrees. The large angular acceptance implies that bi-annual adjustment of the collector orientation is sufficient to accept direct solar radiation. Experimental results from outdoor tests show good agreement with theory and confirm the expected improvement in performance resulting from concentration. Such performance would be useful for space conditioning applications in a temperature range where flat plate collectors are marginal (130F above ambient).

PB-242 263/2GA PC$3.25/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa.
Solar Sea Power.
Quarterly rept. no. 5, 1 Jul-30 Sep 74,
Clarence Zener, Abraham Lavi, Robert R. Rothfus, Charles Kriebel, and Francis McMichael. 31 Oct 74, 17p NSF/RANN/SE/GI-39114/PR/74/5 NSF/RA/N-74-200
Grant NSF-GI-39114
See also PB-236 997.

Descriptors: *Solar sea power plants, Systems analysis, Cost estimates, Design, Heat transfer, Thermodynamics, Instrumentation, Rankine cycle, Reviewing, Reporting, Summarizing, Assessments.
Identifiers: *Technology assessment.

Layouts for the solar sea power plant (SSPP) system component are worked out taking into account components cost and availability, plant maintenance, and ocean mooring. A 100 MWe net SSPP has been costed for a stationary plant located off a Caribbean island where a delta T = 40 degree F can be realized. The cost ranges from a low of $290 to a high of $530 per kW at the bus bar. Transmission or additional energy conversion costs have not been included. Material requirements on a per kW basis for 100 MWe plant have also been established.

PB-242 264/0GA PC$5.75/MF$2.25
Carnegie-Mellon Univ., Pittsburgh, Pa.
Solar Sea Power.
Final rept.,
Abrahim Lavi. 31 Jan 75, 136p
NSF/RANN/SE/GI-39114/PR/74/6 NSF/RA/N-75-021
Grant NSF-GI-39114
See also PB-242 263.

Descriptors: *Solar sea power plants, Systems analysis, Design, Mathematical models, Cost estimates, Heat transfer, Thermodynamics, Instrumentation, Rankine cycle, Assessments.
Identifiers: *Technology assessment.

The solar energy stored in the tropical oceans as heat can be converted into electricity by means of closed Rankine-cycle power plants. Warm surface water is pumped into a heat exchanger to evaporate a working substance under a high pressure. The vapor expands and drives a turbogenerator. Cold water is pumped from below the thermocline into another heat exchanger to condense the low pressure vapor leaving the turbine. The rejected heat is carried away by the condenser water. The process is analyzed, each component is evaluated, and a complete power plant is costed out. With realizable improvements in heat exchangers, it is concluded that a power plant costing $450 - 700/kw can be designed and enough power fed into the U.S. mainland to drastically reduce the nation's dependence on imported fuel by 1985.

PB-242 472/9GA PC$7.25/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Resource Development.
Federal Energy Administration, Electricity Conference (2nd) Held in Washington, D.C. on September 19-20, 1974.
Feb 75, 206p FEA/G-75/179

Descriptors: *Meetings, *Electricity, *Energy conservation, *Electric utilities, Off peak energy storage, Economic analysis, Financing, Financial management, Rates(Costs), Electric power demand, Policies, Demand(Economics), Supply(Economics).

On September 19-20, 1974, the FEA held its Second Electricity Conference. The conference was devoted to a discussion of the serious financial problems which the electric utility industry is experiencing and electricity conservation. The present electric utility situation presents a serious threat to our nation's ability to achieve energy self-sufficiency over the next decade. Two of the more critical aspects of the current situation involve the ability of the utilities to obtain adequate financing for the shift to coal and nuclear generating plants and the implementation of more effective electrical energy conservation programs at every level. Attendees at the Conference represented the investment community, the utility industry, the State regulatory commissions, and consumer and environmental groups, all of which presented their views with respect to these two vital issues.

PB-242 585/8GA PC$5.25/MF$2.25
Electric Power Research Inst., Palo Alto, Calif.
An Overall Program for the Development of Open Cycle MHD Power Generation.
Special rept.
1 May 75, 107p* EPRI-SR-12

Descriptors: *Open cycle MHD generators, *Electric power generation, Cost estimates, Performance, Combustion products, Direct energy conversion, Superconducting magnets.

Open cycle MHD electrical power generation offers the potential of greatly improved efficiency in the use of coal and other fossil fuels. The program described in this document has been formulated to illustrate the type of overall planning required for the development of open cycle MHD power generation, and to provide an initial framework for the coordination of research efforts. The major issues facing the development of open cycle MHD are discussed and an appropriate developmental approach outlined. The program structure, objectives, and decision points are then developed. The main emphasis of the program is on direct coal firing of open cycle MHD systems, although significant attention is directed toward the use of clean fuels. The program leads to a demonstration of the commercial applicability of the technology by means of the operation of an Engineering Demonstration Plant on an electric utility line. This report is the result of the Workshop on the Development of Open Cycle MHD, Palo Alto, May 6-10, 1974.

PB-242 732/6GA PC$4.75/MF$2.25
Delaware Univ., Newark. Inst. of Energy Conversion.
Direct Solar Energy Conversion for Large Scale Terrestrial Use.
Annual progress rept. 1 Jan 73-31 Dec 73.
Jan 74, 95p NSF/RANN/SE/GI34872/PR/73/4 NSF/RA/N-74-006
Grant NSF-GI-34872
See also PB-241 007.

Descriptors: *Solar energy conversion, *Cadmium sulfide solar cells, Substrates, Cost analysis, Cost estimates, Systems analysis, Design, Performance evaluation, Fabrication, Manufacturing, Environmental impacts, Copper inorganic compounds, Sulfides.
Identifiers: Copper sulfides.

Progress is reported on all aspects of the work on Cu2S/CdS solar cells and their application to direct solar energy conversion for large scale terrestrial use. Topics covered are (1) basic studies of Cu(x)S/CdS layers (2) cell lifetimes (3) cell properties at elevated temperatures (4) improved production techniques (5) economic analyses of production costs (6) production of cells and demonstration units (7) systems analysis, and (8) environmental considerations.

PB-242 935/5GA PC$3.25/MF$2.25
McDonnell-Douglas Corp., Santa Monica, Calif.
Heliostat Mount.
Final Invention disclosure,
Clarence R. Applebaugh. 1975, 6p NSF-75-72-GI-39456
Grant NSF-GI-39456

Descriptors: *Solar reflectors, *Solar energy concentrators, *Mountings, Supports, Housings, Design, Drawings, Blueprints.
Identifiers: *Heliostats.

This device is designed to support and move a large reflector in such a way that the reflection of the sun or other moving object is directed to a fixed target point located at any position in the hemisphere above the horizon. The device must have sufficient strength and rigidity to maintain the reflected image accurately on the target point under wind gust conditions. This device provides a stronger, more rigid design than present devices to maintain accurate positioning under wind loading.

10C. Energy Storage

AD-A011 995/8GA PC$3.75/MF$2.25
Defence Research Establishment Ottawa (Ontario)
Nickel/Cadmium Aircraft Batteries: Thermal Considerations,
Keiva Feldman, Ronald L. Haines, and William A. LePage. Apr 75, 26p Rept no. DREO-R-718

Descriptors: *Nickel cadmium batteries, *Thermal properties, Thermal degradation, Cooling, Battery separators, Oxygen, Aircraft, Canada.
Identifiers: Battery charging.

Thermal problems in nickel/cadmium aircraft batteries are serious due to effects on battery life and safety of operation. In this study theoretical background of battery heating and cooling was reviewed and confirmatory experiments were carried out. It was found that when nickel/cadmium batteries are charged at low rates cooling takes place but the reverse is true at high rates. Rapid heating takes place during high rate discharges and also during overcharge if the separator materials permit oxygen to reach the negative plate. Magnitudes involved are illustrated by typical examples.

AD-A012 093/1GA PC$3.75/MF$2.25
Gte Labs Inc Waltham Mass
Sealed Lithium Inorganic Electrolyte Cell.
Quarterly rept. no. 4, 1 Dec 74-28 Feb 75,
N. Marincic, and A. Lombardi. May 75, 49p
ECOM-74-0108-4
Contract DAAB07-74-C-0108
See also quarterly rept. no. 3, AD/A006 810.

Descriptors: *Primary batteries, Lithium, Temperature, Discharge, Performance(Engineering), Reliability(Electronics), Storage.
Identifiers: *Lithium cells.

Work was continued on testing D cells after storage. Data were obtained on the discharge capacity realized at various temperatures and with various discharge rates after the cells had

been stored for one month at 55C or 72C. No capacity deterioration has been observed as a result of storage at elevated temperature, as long as the cells were discharged at low rates. Low discharge capacities were observed with these cells at higher rates and/or lower discharge temperatures, probably due to mass transfer limitations of the passivating film. Voltage delay data were obtained for these cells in a form of time required to reach the cut off voltage of 2.0V after the initial drop at the start of discharge. A strong temperature dependence has been observed of this characteristic, suggesting a possible way of regenerating the cells after a prolonged storage at elevated temperatures.

AD-A012 098/0GA PC$7.00/MF$2.25
Stanford Univ Calif Center for Materials Research
Solid Electrolyte Battery Materials.
Technical rept.,
Robert A. Huggins. 31 Mar 75, 187p Rept nos. CMR-75-10, TR-4
Contract N00014-67-A-0112-0075
See also report dated 31 Mar 74, AD-782 365.

Descriptors: *Battery components, *Storage batteries, *Solid electrolytes, Alkali metal compounds, Alumina, Graphite, Ions, Ionic current, Cellulosic resins, Lithium compounds, Silicates, Electric conductors, Titanates, Germanates, Clathrate compounds, Crystal defects, Tunneling(Electronics), Activation energy.
Identifiers: Lithium silicates, Lithium aluminosilicates, Intercalary compounds, Lithium titanates, Lithium germanates, Graphite fluorine clathrates.

Contents:
- Oxide fabrication via controlled oxidation of polymer precursors;
- The electrical response of some lithium silicates and aluminosilicates;
- Ramsdellite structure lithium titanate and lithium germanates;
- Graphite intercalation compounds;
- Calculation of motional activation energies for interstitial ions in the rutile structure using a minimum energy path model;
- Publications and presentations related to this program.

AD-A012 303/4GA PC$4.75/MF$2.25
Hughes Aircraft Co El Segundo Calif Space and Communications Group
Nickel Hydrogen Energy Storage for Satellites.
Supplement to Final rept. Dec 74-Feb 75,
E. Levy, Jr., and H. H. Rogers. Nov 74, 87p Rept no. SCG-50124 AFAPL-TR-74-111-Suppl-1
Contract F33615-73-C-2064
Supplement to report dated Nov 74, AD-A006 427.

Descriptors: *Storage batteries, *Spacecraft components, Satellites(Artificial), Reliability(Electronics), Nickel, Hydrogen, Test methods.
Identifiers: *Nickel hydrogen batteries.

The purpose of this supplement is to report additional test data on Tyco 50 A-hr boilerplate cells, cycle and capacity test results on Eagle-Picher 20 A-hr 'prismatic' cells and 50 A-hr pineapple-slice design boilerplate cells. Detailed test data are presented and interpreted in this report. An Appendix which discusses selection of material for the nickel-hydrogen battery pressure vessel is also provided.

N75-24016/8GA Not available NTIS
National Aerospace Lab., Amsterdam (Netherlands). Structures and Materials Div.
The Evaluation of NiCd Cell Covers. Part 1: Text and Tables.
Final Report.
W. J. Vandervet, and E. A. B. Degraaf. Aug 74, 33p NLR-TR-74116-C-PT-1, ESRO-CR(P)-610
Contract ESTEC-2019/73
Seri-2.

Descriptors: *Coverings, *Electrochemical corrosion, *Nickel cadmium batteries, *Performance tests, Accelerated life tests, European space programs, Quality control, Stress corrosion, Tables (Data).

For abstract, see STAR 1315

N75-24017/6GA PC$4.75/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands).
The Evaluation of NiCd Cell Covers. Part 2: Figures.
Final Report.
W. J. Vandervet, and E. A. B. Degraaf. 1974, 80p NLR-TR-74116-C-PT-2, ESRO-CR(P)-611
Contract ESTEC-2019/73
Seri-2.

Descriptors: *Coverings, *Nickel cadmium batteries, *Performance tests, Accelerated life tests, Charts, European space programs, Photographs, Quality control, Stress corrosion.

For abstract, see STAR 1315

N75-24097/8GA PC$4.25/MF$2.25
Sperry Rand Corp., New York.
Experimental Investigation and Model Development of the Skylab ATM Secondary Nickel-Cadmium Batteries.
W. W. Kirsch. 10 May 74, 69p NASA-CR-120749
Contract NAS8-21812

Descriptors: *Apollo telescope mount, *Nickel cadmium batteries, *Skylab program, Computerized simulation, Degradation, Electric charge, Mathematical models, Performance prediction.

For abstract, see STAR 1315

11. MATERIALS

11A. Adhesives and Seals

AD-A012 266/3GA PC$7.00/MF$2.25
Firestone Tire and Rubber Co Akron Ohio Central Research Labs
Development and Evaluation of Phosphonitrilic Fluoroelastomer O-Rings.
Final rept. 13 Feb 74-12 Feb 75,
Gary S. Kyker. Apr 75, 176p AMMRC-CTR-75-6
Contract DAAG46-74-C-0066

Descriptors: *O rings, *Fluoropolymers, *Hydraulic seals, Nitriles, Elastomers, Inorganic polymers, Phosphorus compounds, Thermal stability, Flexural properties, Mechanical properties, Low temperature, Tables(Data), Hardness, Tensile strength, Curing, Coatings, Vulcanization, Stress strain relations, Performance(Engineering), Chemical attack(Degradation).
Identifiers: Poly(nitrilo-(phosphoranylylidene/octafluoropentoxy-trifluoroethoxy)), *Poly(nitrilo-phosphoranylylidene).

The purpose of this investigation was to develop and evaluate phosphonitrilic fluorelastomer compounds for O-ring hydraulic seal applications. Formulations were sought which would be serviceable in hydraulic fluids over the temperature range of -80F to 400F. The polymer used in this investigation was a phosphonitrilic fluoroelastomer prepared in the Central Research Laboratories of The Firestone Tire and Rubber Company and having the formula: (P(OCH2CF3)(OCH2C4F8H)N)n. The effects of reinforcing agents, vulcanization agents and stabilizers on compound properties were investigated. Efforts were made to optimize curing times and temperatures; stress-strain properties; hardness; compression set; tear and abrasion resistance; fluid, water, steam and acid resistance, and low temperature flexibility. In addition, the Seal Group of Parker Hannifin fabricated O-ring seals from selected stocks and conducted dynamic extrusion and chew tests on the seals. In related studies experiments were conducted on the coating of stainless steel cable with phosphonitrilic fluoroelastomer compounds.

11B. Ceramics, Refractories, and Glasses

AD-A011 688/9GA PC$3.25/MF$2.25
Colorado Univ Boulder Dept of Mechanical Engineering
The Influence of Microstructure on Fracture of Ceramics.
Final rept. 1 Nov 73-30 Apr 75,
C. Norman Ahlquist, and Rishi Raj. 14 May 75, 19p AFOSR-TR-75-0821
Grant AF-AFOSR-2603-74

Descriptors: *Silicon nitrides, *Fracture(Mechanics), Amorphous materials, Grain boundaries, Viscosity, Measuring instruments, Yield strength, Potassium chloride, Sodium chloride, Lithium fluorides, Additives, Crack propagation, Microstructure.

A technique has been developed for the measurement of the viscosity of the amorphous phase in the grain boundaries of silicon nitride. The technique will serve as a useful tool in the development of these ceramics since a correlation can now be established between the viscosity of the grain-boundary phase and its chemistry. Some work has been completed on building models for intergranular fracture in these materials based upon the concept of fracture in a thin viscous adhesive layer sandwiched between two hard surfaces. A simple model which considers fracture by the growth of penny-shaped voids in the adhesive layer gives sensible agreement with actual fracture measurements in silicon-nitride at elevated temperatures. The relationship between yielding and fracture in semi-brittle ceramic crystals has also been investigated. Strengthening of I-VII compounds, e.g. KCl, NaCl, and LiF, by divalent impurity additions is accompanied by an increase in fracture energy. The observed increase is explained as a result of microcrack nucleation at intersection slip bands.

AD-A011 876/0GA PC$4.25/MF$2.25
Pennsylvania State Univ University Park Materials Research Lab
Characterization of Particulate Aluminas and Use in Evaluating Sintering Characteristics and Theory of the Initial Stage.
Final technical rept.,
L. Tarhay, W. R. Buessem, and E. W. White. 20 Jun 75, 70p
Contract N00014-67-A-0385-0019
Report on Project 'Quantitative SEM Characterization Methods for Ceramic Materials in All Process Stages and Applications to High Strength Aluminas and Silicon Nitride'.

Descriptors: *Alumina, *Sintering, Particles, Electron microscopy, Porosity, Shrinkage, Computer programs.
Identifiers: Scanning electron microscopy, BASIC programming language.

This paper reports the use of the methods developed for complete morphological particulate characterization on a series of alumina powders with the scanning electron microscope (SEM). An attempt is made at correlating the appropriate particulate characteristics with a sintering study performed on the

same alumina powders. In addition, the porosities of the sintered aluminas are characterized using the lineal analysis techniques developed for the SEM yielding pore size and pore distribution data. Models are also proposed for further understanding of initial stage sintering.

11C. Coating, Colorants, and Finishes

AD-A012 345/5GA PC$3.25/MF$2.25
Naval Air Development Center Warminster Pa Air Vehicle Technology Dept
Aeronautical Analytical Rework Program: Thixotropic Chemical Conversion Coating for the Corrosion Protection of Air Craft Aluminum Surfaces.
Final rept.,
P. N. Bellavin. 6 Jun 75, 24p Rept no. NADC-75024-30

Descriptors: *Protective coatings, Aluminum alloys, Airframes, Surfaces, Performance(Engineering), Corrosion resistance, Adhesion, Stability, Low temperature, Aircraft.
Identifiers: Thixotropy.

This report covers processes for application and the use of a sprayable/brushable thixotropic, chemical conversion coating for the corrosion protection of aircraft skin surfaces and components. Results of field evaluations, specification performance and formulations are given. Current application problems encountered during rework operation in the control of rapid run-off from vertical and curved aircraft surfaces are discussed.

N75-23753/7GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Variation of Solar-Selective Properties of Black Chrome with Plating Time.
G. E. Mcdonald, and H. B. Curtis. May 75, 10p NASA-TM-X-71731, E-8356

Descriptors: *Black body radiation, *Chromium compounds, *Nickel plate, *Reflectance, *Solar spectra, Emittance, Energy policy, Infrared radiation, Plating, Solar collectors, Thermal absorption.

For abstract, see STAR 1315

N75-23755/2GA PC$5.75/MF$2.25
General Electric Co., Cincinnati, Ohio. Aircraft Engine Group.
Examination of the Influence of Coatings on Thin Superalloy Sections. Volume 1: Description and Analysis.
M. Kaufman. Dec 74, 135p NASA-CR-134791
Contract NAS3-16759

Descriptors: *Aluminum coatings, *Heat resistant alloys, Castings, Creep rupture strength, Mechanical properties, Microstructure, Nickel alloys, Tensile strength, Thermal fatigue.

For abstract, see STAR 1315

N75-23756/0GA PC$6.25/MF$2.25
General Electric Co., Cincinnati, Ohio.
Examination of the Influence of Coatings on Thin Superalloy Sections. Volume 2: Detailed Procedures and Data.
M. Kaufman. Dec 74, 153p NASA-CR-134792
Contract NAS3-16759

Descriptors: *Corrosion resistance, *Nickel alloys, *Protective coatings, Chemical composition, Metallography, Performance tests, Stress concentration, Tensile tests, Thermal fatigue, X ray diffraction.

For abstract, see STAR 1315

N75-23757/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Diffusion Layers Formed in Salt Media and Molten Oxides.
H. Vanderpoorten, A. Dehaan, and R. Olivier. Jun 75, 21p NASA-TT-F-16381
Contract NASW-2483
Tran-Transl. Into English from Silicates Ind. (Belgium), V. 38, No. 11, 1973 p 223-231.

Descriptors: *Electrodeposition, *Molten salt electrolytes, Cathodes, Chlorides, Current density, Electrolytes, Molecular diffusion, Salt baths, Silicates, X ray diffraction.

For abstract, see STAR 1315

PATENT-3 847 542 Not available NTIS
Department of Agriculture, Washington, D.C.
Process for Preparing Frosted and Multicolored Cotton Pile Fabrics.
Patent,
Robert J. Harper, Jr., Eugene J. Blanchard, and Gloria A. Gautreaux. Filed 1 Jun 73, patented 12 Nov 74, 6p PAT-APPL-365 897,
Supersedes PB-230 414.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Cotton fabrics, *Dyeing, *Patents, Crosslinking, Textile finishing.
Identifiers: PAT-CL-8-66.

This invention relates to the dyeing of cotton and other cellulosic containing fabrics in such a manner as to produce frosted fabrics. The frosted appearance is achieved by a method in which the tops of the loops are undyed whereas the ground or bottom of the loops are dyed. In the first step of this process, the fabric is coated with a crosslinking agent and a thickener. The crosslinking agent should be of the type that can be easily hydrolyzed from the fabric. After the protective crosslinking has been performed on the pile, either on one or both sides of the fabric, the fabric is dyed with a cotton dye (preferably a reactive dye). In the third step the crosslinking agent and thickener are hydrolyzed from the fabric to produce a soft pile fabric with the proper frosted effect. If the production of a multicolored pile fabric is desired, the cotton fabric can now be redyed using a lower concentration of dye and a color of lower depth than in the initial dyeing.

11D. Composite Materials

AD-A011 761/4GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
The Corrosion of 6061 Aluminum Alloy-Thornel 50 Graphite Composite in Distilled Water and NaCl Solution.
Interim rept.,
Dennis L. Dull, William C. Harrigan, Jr., and Maurice F. Amateau. 6 May 75, 20p Rept no. TR-0075(5621)-2 SAMSO-TR-75-130
Contract F04701-74-C-0075

Descriptors: *Fiber reinforced composites, *Corrosion, Aluminum alloys, Carbon fibers, Graphite, Distilled water, Salt water, Rates, Galvanic corrosion.
Identifiers: Aluminum alloy 6061.

The corrosion behavior of a 6061 aluminum alloy-Thornel 50 graphite composite has been examined in both distilled water and 3.5% NaCl solution at three temperatures: 298K (25C), 323K (50C), and 348K (75C). The corrosion rate was determined by the weight change and was monitored for times up to 1000 hr. The corrosion rates were maximum immediately after the initial immersion and decreased with increasing time of exposure. The NaCl solution was far more corrosive than the distilled water, and increasing the temperature resulted in an increased corrosion rate. The mode of attack appears to be crevice corrosion promoted by galvanic coupling between the aluminum matrix and graphite fibers.

AD-A012 103/8GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
Metal Fiber Reinforced Ceramics (Survey).
Yu. E. Busalov, and I. M. Kopev. 10 Dec 74, 25p Rept no. FSTC-HT-23-226-75
Trans. of Fizika i Khimiya Obrabotki Materialov (USSR) n1 p57-69 1971.

Descriptors: *Fiber reinforced composites, *Ceramic materials, Metal fibers, Bending, Brittleness, Thermal shock, Translations, USSR.
Identifiers: Ceramic composites, Metal fiber reinforced ceramics.

The author discusses the properties of metal fiber reinforced ceramics and ways of improving their bending strength, brittleness and resistance to shock with the ultimate aim of using them as structural materials.

AD-A012 265/5GA PC$5.25/MF$2.25
Hughes Helicopters Culver City Calif
Producibility and Serviceability of Kevlar-49 Structures Made on Hot Layup Tools.
Final rept. 31 May 74-30 Apr 75,
R. Head, J. Leach, R. Goodall, and C. Sitterly. May 75, 114p AMMRC-CTR-75-10
Contract DAAG46-74-C-0100

Descriptors: *Helicopters, *Fairings, *Composite materials, *Forming techniques, Fabrication, Hot pressing, Assembly, Cooling, Flight testing.
Identifiers: Kevlar resins, Kevlar-49 resins, H-6 aircraft, OH-6A aircraft.

The purposes of the program were: evaluate the producibility of a helicopter structural component made from Kevlar-49 fibers, demonstrate the low cost aspects of using hot layup tools to fabricate composite structures, and evaluate the serviceability of the Kevlar-49 structure in actual field operations.

AD-A012 269/7GA PC$7.25/MF$2.25
Mcdonnell Douglas Astronautics Co Huntington Beach Calif
Investigation of Brittle Fractures in Graphite-Epoxy Composites Subjected to Impact.
Final rept. 7 Nov 73-20 Dec 74,
L. B. Greszczuk, and H. Chao. May 75, 217p Rept no. MDC-G5656 USAAMRDL-TR-75-15
Contract DAAJ02-74-C-0009

Descriptors: *Reinforced plastics, *Impact tests, *Fracture(Mechanics), Brittleness, Carbon fibers, Graphite, Epoxy resins, Alignment, Cylinders, Stresses, Computer applications, Fiberglass, Aircraft.
Identifiers: Epoxy matrix composites, Carbon fiber reinforced plastics, Fiberglass reinforced plastics, *Graphite reinforced composites, Polysulfones, Polysulfone matrix composites.

The principal objectives of this program were (1) to establish how the brittle fracture characteristics of graphite-epoxy composites subjected to impact are influenced by such parameters as fiber and matrix properties, fiber orientation, stacking sequence, laminate thickness, curvature effects and interleaving effects and (2) to recommend solutions to the brittle fracture problem. To accomplish these objectives, a three-phase program was conducted. Phase I involved a literature survey on the experimental and theoretical work on the brittle fracture of composites subjected to impact as well as a literature survey on failure theories for brittle, orthotropic, and anisotropic

materials. In Phase II, available computer solutions such as SAAS III, ASAAS and CYLINDER were modified and/or extended to the problems. In Phase III the test plan was implemented, which involved fabrication and impact testing of specimens. Types of graphite fibers used in the experimental program included Thornel 300, Modmor II and Celion GY-70. Types of resins investigated included 5208 epoxy, ERLA 4617 and polysulfone.

AD-A012 311/7GA PC$5.25/MF$2.25
Auburn Univ Ala Dept of Mechanical Engineering
Stability of Glass Fiber-Plastic Composites.
Technical rept.,
Wartan A. Jemian, Roy C. Wilcox, and Andrew C. T. Hsu. Nov 74, 103p RL-75-6
Contract DAAH01-73-C-0466

Descriptors: *Reinforced plastics, *Glass fibers, Test methods, Degradation, High temperature, Water, Surface finishing, Silanes, Tensile properties, Light scattering, Chemical analysis, Stabilization.
Identifiers: *Fiberglass reinforced plastics.

Exploratory research was conducted to determine the stages and nature of degradation of glass fiber-plastic composite systems under various environmental conditions. A number of mechanical, physical and chemical tests were performed on the individual components in the system and on samples of composites made of these components. It was found that the glass filaments are a reactive component and lose their strength rapidly on direct exposure to water at elevated temperatures. Magnesium is a particularly active component. It was also found that the silane coupling agent that is incorporated in standard commercial glass finishes is a possible reactive component. It is recommended that research be conducted to find ways to stabilize the glass and glass fiber-epoxy composite structural materials against water degradation. A possible experimental research program was outlined for this purpose.

AD-A012 382/8GA PC$5.25/MF$2.25
Naval Air Development Center Warminster Pa Air Vehicle Technology Dept
Acoustic Emission in Fiber Reinforced Composites.
Master's thesis,
John M. Carlyle. 15 May 75, 107p Rept no. NADC-75082-30

Descriptors: *Reinforced plastics, *Fiber reinforced composites, *Ultrasonic tests, *Nondestructive testing, *Acoustic emissions, Fatigue(Mechanics), Fracture(Mechanics), Crack propagation, Stresses, Theses.
Identifiers: Carbon fiber reinforced plastics, Graphite reinforced composites.

Acoustic emission monitoring offers a simple means of studying the effects that microscopic defects have on composites, since the emissions are a direct result of material deformations. This dissertation examines the research and development applications that acoustic emission monitoring has for fiber reinforced composites. Specific emphasis is placed upon obtaining information from fundamental failure processes, but practical engineering applications are reviewed as well, including fatigue crack detection and structural integrity evaluation. Basic principles of the phenomenon are covered, including the generation of emissions, the propagation of stress waves through materials, the production of electrical signals from mechanical stress waves, and signal processing to obtain data on microscopic sample deformations. An experiment is discussed which indicates that six-ply, 0 degree, plus or minus 45 degree carbon fiber reinforced plastic can be successfully monitored for incipient failure.

JPRS-64968 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Composition of a Diamond Alloy,
R. A. Alikhanov, E. S. Chebotareva, S. G. Nuzhdina, and V. P. Modenov. 11 Jun 75, 7p
Trans. of Akademiya Nauk SSSR. Doklady, v220 n2 p325-327 1975.

Descriptors: *Composite materials, Diamonds, Titanium alloys, Copper containing alloys, Binders(Materials), Translations, USSR.
Identifiers: *Diamond matrix composites.

The report contains an investigation of a diamond composite material prepared by impregnating fine-crystalline diamond powder using a binder consisting of the alloy 55 weight percent Ti and 45 weight percent Cu.

N75-23696/8GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Preparation and Properties of Tungsten-Wire Reinforced Nicr 80-20.
H. W. Gruenling. May 75, 17p NASA-TT-F-16275
Contract NASW-2483
Tran-Transl. Into English from Deut. Ges. Metallk. (Oberussel), 1972 p 138-152. Conf-Presented at the 2D Composite Matter. Meeting, Konstanz, West Ger., 15-16 Mar. 1972.

Descriptors: *Chromium alloys, *Mechanical properties, *Nickel alloys, *Reinforcing fibers, *Wire, Composite materials, Infiltration, Liquids, Preparation, Tungsten.

For abstract, see STAR 1315

N75-23697/6GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Anelastic Deformation of Boron Fibers.
J. A. Dicarlo. 3 Apr 75, 16p NASA-TM-X-71710, E-8326
Conf-Presented at the AM. Phys. Soc. Meeting, Denver, Colo., 31 Mar. - 3 Apr. 1975.

Descriptors: *Anelasticity, *Boron, *Elastic deformation, *Fiber strength, *Vapor deposition, Internal friction, Relaxation time, Stress relaxation, X ray analysis.

For abstract, see STAR 1315

N75-23698/4GA PC$6.25/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Specialists Meeting on Failure Modes of Composite Materials with Organic Matrices and Their Consequences on Design.
Mar 75, 162p AGARD-CP-163
Conf-Presented at 39TH Meeting of the Struct. And Mater. Panel, Munich, 13-19 Oct. 1974.
In English; Partly in French.

Descriptors: *Composite materials, *Conferences, *Failure modes, *Organic materials, *Structural design, Fiber strength, Fracture strength, Isotropy, Matrices, Research and development.

For abstract, see STAR 1315

N75-23713/1GA , PC$3.25/MF$2.25
Hawker Siddeley Dynamics Ltd., Hatfield (England). Space Div.
The Use of Carbon Fibre Reinforced Plastics in Satellite Structures. Volume 1: Summary.
Final Report on Phase 2, Oct. 1973 - Dec. 1974.
J. Dickinson. Dec 74, 14p HSD-TP-7509-VOL-1-SUMM, ESRO-CR(P)-597
Contract ESTEC-1735/72-PP
Seri-2.

Descriptors: *Carbon fiber reinforced plastics, *Mechanical properties, *Spacecraft structures, *Thermodynamic properties, Booms (Equipment), Epoxy resins, Fatigue tests, Honeycomb structures, Inserts, Joints (Junctions), Shock tests, Thermal cycling tests.

For abstract, see STAR 1315

N75-24004/4GA PC$3.25/MF$2.25
Institut National des Sciences Appliquees, Villeurbanne (France). Lab. de Mecanique des Contacts.
Third Body Formation and Elimination on Carbon Fiber Epoxy Composite.
D. Play, and M. Godet. 1975, 18p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Carbon fiber reinforced plastics, *Dry friction, *Foreign bodies, *Removal, *Wear tests, Coatings, Friction measurement, Ring structures, Steels.

For abstract, see STAR 1315

N75-24005/1GA PC$3.75/MF$2.25
Centre National d'Etudes Spatiales, Toulouse (France).
Composite Self Lubricating Materials for Space Applications Materiaux Composites Auto Lubrifiants pour Utilisations Spatiales.
M. Roussel, C. Martin, and J. Sailleau. 1975, 44p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Ball bearings, *Composite materials, *Self lubricating materials, *Spacecraft environments, *Wear tests, Coefficient of friction, Molybdenum disulfides, Polyimide resins, Polytetrafluoroethylene, Ultrahigh vacuum.

For abstract, see STAR 1315

N75-24035/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Thermal Loading in the Laser Holography Nondestructive Testing of a Composite Structure.
H. K. Liu, and R. L. Kurtz. May 75, 24p NASA-TR-R-439, M-133

Descriptors: *Composite structures, *Holography, *Nondestructive tests, *Thermal stresses, Glass fibers, Interferometry, Laminates, Lasers, Mathematical models, Thermal conductivity.

For abstract, see STAR 1315

11E. Fibers and Textiles

PAT-APPL-506 934/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Durable Press Chemical Finishing of Cotton-Blend Textiles by Sublimation Drying.
Patent Application,
Norton A. Cashen. Filed 17 Sep 74, 13p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Durable press treating, Vacuum, Cotton fabrics, Strength, Abrasion resistance, Drying, Sublimation, Curing.

The patent application concerns the use of vacuum to produce a chemical cure and chemical fixation by quick freezing sublimation drying the cotton textile. The resulting durable press cotton textiles showed improved strength and abrasion resistance, with attendant improvement in aesthetic properties with relatively low chemical add-on.

PAT-APPL-527 399/GA PC$3.25/MF$2.25
Department of Agriculture, Washington, D.C.
Cotton-Tung Oil Durable-Press Textiles with High Flex Abrasion Resistance.
Patent Application,
James A. Harris, and Jett C. Arthur, Jr. Filed 26 Nov 74, 15p
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Patent applications, *Tung oil, *Durable press treating, Abrasion resistance, Curing, Heat treatment, Gamma rays, Cotton fabrics.

The patent application relates to the impregnation of cotton fabric with a naturally occurring product to improve its physical properties. Cotton fabric is impregnated with tung oil, which is obtained from the fruit of the tree Aleurites fordii, and then subjected to a high energy radiation treatment and/or a heat treatment to yield a cotton textile with durable-press properties, such as improved wrinkle recovery after deformation and improved flex abrasion resistance.

PATENT-3 849 066 Not available NTIS
Department of Agriculture, Washington, D.C.
Method of Increasing Covering Power of Knitted Cotton Fabric.
Patent,
John G. Frick, Jr, and Gloria A. Gautreaux. Filed 13 Sep 72, patented 19 Nov 74, 4p PAT-APPL-288 806,
Supersedes PB-230 636.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Cotton fabrics, *Textile finishing, Cotton spun yarns, Crosslinking, Rolling, Opacity, Permeability.
Identifiers: PAT-CL-8-115-5.

The patent describes a method of increasing covering power of knitted cotton fabric. Yarns in knitted cotton or other cellulosic fabric are subjected to modification of cross-sectional dimensions through the use of press rollers and are immediately thereafter cross-linked thereby durably increasing the covering power (as measured by air-permeability) and/or the opacity of the treated fabric.

PATENT-3 854 873 Not available NTIS
Department of Agriculture, Washington, D.C.
Use of Sodium Bisulfite in an Improved Process for the Treatment of Cellulose Textile Materials with Carbamate Finishing Agents and Sulfurous Acid.
Patent,
John D. Reid, Robert M. Reinhardt, Russell M. H. Kullman, and Norton A. Cashen. Filed 13 Dec 72, patented 17 Dec 74, 3p PAT-APPL-314 651,
Supersedes PB-229 177.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Textile finishing, *Patents, *Sodium sulfites, *Wrinkle resistance, Curing, Cellulose, Carbinols, Carbamates, Sulfurous acid, Tear strength.
Identifiers: PAT-CL-8-187.

The patent concerns the use of small quantities of sodium bisulfite with a carbamate finishing agent and sulfurous acid in the treatment of cellulose-containing textile materials. By adding sodium bisulfite to the treatment formulation, a wider range of curing temperatures may be used to achieve a better strength to wrinkle recovery relationship in the treated textile material than that obtained by treatment with formulations containing a methylol carbamate finishing agent and sulfurous acid. The sodium bisulfite may be employed in finishing processes using pad-dry-cure steps and in the mild cure finishing process.

PATENT-3 881 977 Not available NTIS
Department of the Air Force Washington D C
Treatment of Graphite Fibers.
Patent,
Richard J. Dauksys. Filed 15 Nov 72, patented 6 May 75, 7p Rept nos. PAT-APPL-306 648,
Superseded AD-164 464.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Carbon fibers, *Patents, Fabrication, Heat treatment, Plastic coatings, Fiber reinforced composites, Graphite.
Identifiers: PAT-CL-156-242, Graphite reinforced composites.

The patent describes a method of fabricating a composite reinforced with graphite yarn that comprises heating the yarn in an oxidizing atmosphere and then coating the yarn with a thermoplastic polymer. Thereafter, the treated yarn is coated with a thermosetting resin prior to fabrication of composites having greatly enhanced interlaminar shear strength.

PB-242 582/5GA PC$9.50/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Fuels Research Lab.
Measurement of Flammability and Burn Potential of Fabrics.
Summary rept. 1 Dec 71-31 Jan 73,
Arun K. Mehta, and Franklin Wong. 15 Feb 73, 331p NSF/RA/E-73-191
Grant NSF-GI-31881
Prepared in cooperation with National Bureau of Standards, Washington, D.C. Government-Industry Research Committee on Fabric Flammability.

Descriptors: *Fabrics, *Flammability, *Thermal burns, Skin(Anatomy), Heat transfer, Burns(Injuries), Experimental design.

Two types of inanimate materials having the average thermal properties of human skin were studied. The thermal properties of both types of skin simulants, which were checked by exposing them to known radiant fluxes and monitoring the temperature response, were found to agree closely with the design values. A set of twenty different fabrics, widely used in apparel, were tested. The depth of thermal damage was found to increase approximately linearly with increase in the total thermal dose to skin, for the exposure times and the magnitudes of the heat fluxes involved in these specific fabric burning experiments. This finding indicates the possibility of rating the burn damage potential of fabrics, crudely, by only two measurements, namely flame spread rate and total thermal damage to skin. Measurements of the heat transfer rates from the leading edge to the fuel were conducted with the flame spread burner. These experiments indicate that about 2/3 of the preheat energy is delivered ahead of the leading edge of the flame while the highest intensity of energy is confined to a small region under the flame extension.

11F. Metallurgy and Metallography

AD-A011 717/6GA PC$7.25/MF$2.25
Boeing Commercial Airplane Co Seattle Wash
Exploration of Statistical Fatigue Failure Characteristics of 0.063-Inch Mill-Annealed Ti-6Al-4V Sheet and 0.050-Inch Heat-Treated 17-7PH Steel Sheet Under Simulated Flight-By-Flight Loading.
Final rept. Aug 72-Mar 74,
J. P. Butler, and D. A. Rees. Jan 75, 223p AFML-TR-74-269
Contract F33615-72-C-2003

See also report dated Jul 74, AD/A-002 310.

Descriptors: *Titanium alloys, *Stainless steel, Fatigue(Mechanics), Loads(Forces), Cracking(Fracturing), Flight loads, Fatigue life, Simulation, Reliability, Airframes, Statistical analysis, Sheets.
Identifiers: Titanium alloy 6 Al 4V, Steel 17-7PH.

A total of 17 mill-annealed Ti-6Al-4V 0.063-in. sheet and 14 heat-treated 17-7PH steel 0.050-in. sheet, unique multidetail specimens were fatigue tested under a flight-by-flight loading spectrum to develop a data base for investigating the statistical materials/structures fatigue failure characteristics of these two alloys. Columnar buckling restraint was provided for specimens by welded fixtures sandwiching the specimens. A painted crack detection circuit was applied to locate and control size of initiated cracks. In several cases, test specimens of the relatively hard 17-7PH steel fractured before initiated cracks or initial flaws were detected. At open hole structural simulators detected fatigue cracks were removed by oversizing. The initiation data were examined by maximum likelihood methods for both log-normal and Weibull distributional representation. At a 0.50 reliability level, the results did not show an obvious distributional representation. At a 0.50 reliability level, the results did not show an obvious advantage of either distribution, but on increased levels of reliability, the Weibull distribution was a significantly more conservative simulation of the test data, which showed less variability than that estimated in a previous study.

AD-A011 841/4GA PC$3.25/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
The Interaction of Cyclic Shear and Axial Tension in Cyclic Creep of Titanium.
Technical rept.,
Pankaj K. Basu, and Charles K. Gilmore. May 75, 18p Rept no. TR-22
Contract N00014-75-C-0276

Descriptors: *Titanium, *Creep, Cyclic tests, Stresses, Strain(Mechanics).
Identifiers: Axial stress, Axial strain.

The 'cyclic creep' of commercially pure titanium was determined as a function of cyclic torsional strain amplitude and constant axial stress. For a fixed axial stress, the axial strain is proportional to the square of the cyclic torsional strain. Previous experiments have indicated a linear proportionality, but these more expensive experiments show conclusively that there is a quadratic proportionality. For a fixed peak cyclic torsional strain amplitude the axial strain is linearly proportional to the axial stress. In these tests no point of instability in the cyclic strain is observed as either axial stress or cyclic torsional strain amplitude is increased. This indicates that no truly elastic response is observed in this alloy under these cyclic test conditions.

AD-A011 842/2GA PC$3.25/MF$2.25
George Washington Univ Washington D C Inst for the Study of Fatigue Fracture and Structural Reliability
Static and Cyclic Creep Properties of Ti-6Al-4V for Several Heat Treatments.
Technical rept.,
Charles M. Gilmore, and M. Ashraf Imam. Apr 75, 25p Rept no. TR-21
Contracts N00014-75-C-0276, N0019-75-C-0093

Descriptors: *Titanium alloys, *Creep, Aluminum alloys, Vanadium alloys, Cyclic tests, Static tests, Annealing, Recrystallization, Strain(Mechanics), Grain boundaries, Dislocations, Deformation, Crack propagation.
Identifiers: Titanium alloy 6Al 4V.

The room temperature static and 'cyclic' creep properties were determined for Ti-6Al-4V in three anneal conditions (alpha beta) anneal, beta anneal and recrystallized anneal). The static and 'cyclic' creep strains were inversely related to microstructure. The beta annealed alloy has the smallest static creep strain and the largest 'cyclic creep' strain; the recrystallized anneal alloy has the largest static creep and the smallest 'cyclic creep.' This behaviour indicates that static creep and 'cyclic creep' are a result of different mechanisms. It is proposed that the static creep is a result of dislocation motion within the grains, and the dislocation motion is impeded by phase and grain boundaries to limit static creep strains. The 'cyclic creep' deformation appears to be localized at the grain and phase boundaires. It is proposed that in 'cyclic creep' the dislocations migrate to the strong boundaries and then move back and forth under the cyclic loading producing vacancies at jog sites during each cycle. The vacancies condense into microcracks that are observed after etching.

AD-A011 909/9GA PC$4.25/MF$2.25
Rensselaer Polytechnic Inst Troy N Y School of Engineering
The Effect of Quench Rate on the Properties and Morphology of Ferrous Martensite.
Technical rept.,
S. J. Donachie, and G. S. Ansell. Mar 75, 52p
Rept no. TR-5
Contract N00014-67-A-0117-0011

Descriptors: *Steel, *Quenching, *Phase transformations, Austenite, Martensite, Hardness, Nickel alloys, Morphology, Microstructure, Mechanical properties.

The effect of high quench rate on the M sub s temperature, percent transformed, martensite morphology and austenite hardness has been studied for several Fe-Ni-C steels. For these steels the quench rate was varied only in the austenite region. The M sub s temperature was found to increase with increased quench rate for both high and low carbon steels while the percent transformation increased or decreased depending upon the morphology of the steel. Parallel aligned plate structures were observed which resemble a twinned lath morphology. It was demonstrated that the actual difference between this morphology and a true lath structure. The morphology changes were compared to the measured changes in martensite properties in order to identify the mechanism of the morphology shift. It was concluded that for these alloys the morphology was controlled by the austenite shear mode.

AD-A011 981/8GA PC$3.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Microstructural Evaluation and Control.
Final rept. Sep 69-Jun 75,
John J. Petrovic, Harry A. Lipsitt, and Loren A. Jacobson. Apr 75, 8p Rept no. ARL-75-0109

Descriptors: *Aluminum alloys, *Silver alloys, *Zinc alloys, Microstructure, Thermomechanics, Phase studies, Grain boundaries, Precipitates, Mechanical properties.
Identifiers: Aluminum alloy 2024, Aluminum alloy 6Cr, Aluminum alloy 0.6Zr.

The microstructures of metallic systems were investigated. The three distinct areas of effort were: (1) Effects of thermomechanical processing on properties of aluminum alloy; (2) precipitation in aluminum 4% chromium and aluminum 0.6% zirconium alloys; and, (3) 2024 deformation and annealing of silver-nickel two-phase alloys. The major results are summarized.

AD-A012 057/6GA PC$3.25/MF$2.25
Systems Research Labs Inc Dayton Ohio
Tensile Properties to 550 C and Microstructures in Quenched and Aged Ti-6Al-2Sn-4Zr-6Mo Alloy,
M. G. Mendiratta, and J. A. Roberson. 24 Jun 74, 6p ARL-75-0210
Contract F33615-71-C-1841
Availability: Pub. in Metallurgical Transactions A, v6A p940-943 Apr 75.

Descriptors: *Titanium alloys, *Heat treatment, Tensile properties, Microstructure, Martensite, Quenching, Tempering, Age hardening, Embrittlement, Reprints.
Identifiers: Titanium alloy 6Al 6Mo 2Sn 4Zr.

A range of room and elevated temperature tensile properties was obtained for quenched and aged Ti-6Al-2Sn-4Zr-6Mo alloy. The heat treatments produced two types of microstructures in the alloy: (1) Varying amounts of primary alpha phase together with beta phase, and (2) Varying amounts of tempered martensite together with primary alpha. The alloy containing tempered martensite developed a very high tensile strength at 550 C but severe embrittlement at room temperature; this behavior was attributed to the precipitation of very fine beta particles in the martensite.

AD-A012 095/6GA PC$4.75/MF$2.25
Sylvania Electric Products Inc Towanda Pa Chemical and Metallurgical Div
Development of Dispersion-Strengthened Nickel and Cobalt-Base Alloys.
Yearly summary rept. 1 Aug 64-31 Jul 65,
Richard F. Cheney, and J. S. Smith. 31 Aug 65, 95p
Contract AF 33(615)-1697

Descriptors: *Nickel alloys, *Cobalt alloys, *Dispersion hardening, Molybdenum alloys, Thorium dioxide, Hot pressing, Sintering, Compacting, Powder metallurgy.
Identifiers: Nickel alloy 15Mo 4ThO2, Cobalt alloy 15Mo 4ThO.

Two methods were compared for preparing dispersion-strengthened nickel- and cobalt-base alloys. A technique of selectively reducing intimately mixed oxides, which were prepared by atomizing and drying a solution of the components, was more successful than one involving the coating of dispersoid particles with the matrix by vapor deposition. The conditions were determined for preparing Ni-15Mo-4ThO2 and Co-15Mo-4ThO2 powders by selective reduction. Hot pressing, hydrogen sintering, and powder rolling were evaluated for powder consolidation. The conditions for successful rolling, extrusion, and forging were investigated for Ni-15Mo-4ThO2. Process temperatures above 1200C promoted ThO2 growth to 400-500A. Deformation-anneal sequences were critical to good strength at elevated temperatures. Ultimate strengths of 21 ksi at 1800F were obtained and higher strengths seem possible. Molybdenum considerably improved the matrix strength to at least 1400F.

AD-A012 184/8GA PC$3.25/MF$2.25
Colorado Univ Boulder
Use of the Internal Friction Technique to Measure Rates of Grain Boundary Sliding,
D. R. Mosher, and Rishi Raj. 13 May 74, 8p
AFOSR-TR-75-0916
Grant AF-AFOSR-2501-73
Abstract in French and German.
Availability: Pub. in Acta Metallurgica, v22 p1469-1474 Dec 74.

Descriptors: *Grain boundaries, *Internal friction, *Copper alloys, *Measurement, Viscosity, Damping, Polycrystalline, Solid solutions, Reprints.

AD-A012 217/6GA PC$3.25/MF$2.25
Syracuse Univ N Y George Sachs Fracture and Fatigue Research Lab
Crack Tip Strain - A Comparison of FEM Calculations and Measurements.
Technical rept.,
Wan-liang Hu, and H. W. Liu. Apr 75, 24p ARO-11961.1-E
Grant DAHC04-74-G-0165

Descriptors: *Fracture(Mechanics), *Strain(Mechanics), Plastic deformation, Crack propagation, Triaxial stresses, Toughness, Aluminum, Finite element analysis.
Identifiers: Fracture toughness.

Earlier crack tip strain measurements have shown a definitive three dimensional effect upon crack tip deformation. In this study, a pseudo three dimensional Finite element method (FEM) calculation is made with a composite stiffness matrix. The calculated strains agree exceedingly well with the experimental measurements. The degree of crack tip stiffening is equivalent to only 4% of the plane strain plastic zone along the crack front in a 1/4 inch thick aluminum speciment, and 8% for a 1/2 inch thick speciment. Both specimens are loaded considerably beyond general yielding. The results cast serious doubt upon the premise that the specimen, with extensive plastic deformation, can be used to determine plane strain fracture toughness.

AD-A012 251/5GA PC$3.25/MF$2.25
Drexel Inst of Tech Philadelphia Pa
Solid Solution Hardening and Softening in <110> and <100> Tantalum-Tungsten Single Crystals,
Prakash D. Parikh, and D. Robert Hay. 18 Nov 74, 5p ARO-6945.5-MC
Grant DA-ARO-D-31-124-G933
Availability: Pub. in Scripta Metallurgica, v9 n3 p229-232 1975.

Descriptors: *Tantalum alloys, *Tungsten alloys, *Solid solutions, *Strain hardening, Single crystals, Transition metals, Reprints.
Identifiers: Flow stress.

In the body centered cubic transition (bcct) metals, elements in solid solution affect the thermal and athermal components of the flow stress differently. While solute additions only increase the athermal component, they can either raise or lower the thermal component (1). Solute addition can also affect the slip geometry and thus influence the orientation dependence of yielding (2). This note describes the results of a study of the orientation dependence of the thermal and athermal components of the flow stress of <110> and <100> tantalum-tungsten single crystals tested in compression. (Author)

AD-A012 365/3GA PC$12.00/MF$2.25
National Bureau of Standards Boulder Colo Cryogenics Div
Materials Research for Superconducting Machinery III.
Semi-annual technical rept. 1 Sep 74-1 Mar 75,
Richard P. Reed, Alan F. Clark, and Edward C. van Reuth. Mar 75, 500p
Prepared in cooperation with Battelle, Columbus Labs., Ohio, General Electric Co., Schenectady, N.Y. Research and Development Center, Martin Marietta Aerospace, Denver, Colo. Denver Div., and Westinghouse Electric Corp., Pittsburgh, Pa. Research and Development Center.

Descriptors: *Superconductors, Handbooks, Cryogenics, Fiber reinforced composites, Stainless steel, Reinforced plastics, Nickel alloys, Aluminum alloys, Titanium alloys, Vanadium alloys, Iron alloys, Copper alloys, Tin alloys, Thermal conductivity, Fracture(Mechanics), Fatigue(Mechanics), Elastic properties, Tensile properties, Magnetic properties, Thermal expansion, Specific heat, Soldering, Welds, Nickel alloy inconel, Potting compounds.

The third semi-annual technical reports are collected from five subcontractors of an ARPA sponsored program on the very low temperature properties of structural materials to support the development of superconducting machinery. The program is outlined and research progress is reported. Low temperature data are presented for the elastic, tensile, fatigue, and fracture properties, thermal expansion, specific heat, thermal and magneto-thermal conductivity, electrical and magnetic properties of structural alloys. Effects of processing, and fabrication are also reported for many of the properties; weld and braze joint properties are included. Low temperature properties for composites are reviewed and limited tensile and flexure data at 4 K presented.

AD-A012 390/1GA PC$3.75/MF$2.25
Rensselaer Polytechnic Inst Troy N Y School of Engineering
The Volume Expansion Accompanying the Martensite Transformation in Iron-Carbon Alloys.
Technical rept.,
J. M. Moyer, and G. S. Ansell. Jun 75, 32p Rept no. TR-6
Contract N00014-67-A-0117-0011

Descriptors: *Steel, *Iron alloys, *Phase transformations, Martensite, Austenite, Expansion, Carbon alloys, Crystal structure.

A dilatometric investigation was conducted to determine the effect of carbon on the volume expansion accompanying the martensite transformation in iron-carbon alloys. It was found that the volume expansion at the (M sub s) temperature varies from 2.0% at .19 weight percent carbon to 3.1% at 1.01 percent carbon, largely due to the effect of carbon on lowering the temperature at which the transformation occurs. Also of importance is the solid solution effect of carbon on altering the lattice parameters of both the austenite and martensite phases at the (M sub s).

AD-A012 391/9GA PC$7.25/MF$2.25
Illinois Univ At Urbana-Champaign Dept of Metallurgy and Mining Engineering
Low Temperature Hydrogen Embrittlement in Niobium.
Doctoral thesis,
Martin L. Grossbeck, and Howard K. Birnbaum. Jun 75, 209p
Contract N00014-67-A-0305-0020

Descriptors: *Niobium, *Hydrogen embrittlement, Crack propagation, Electron microscopy, Fracture(Mechanics), Tensile properties, Plastic deformation, Hydrides, Low temperature, Theses.
Identifiers: Niobium hydrides.

An experimental study of hydrogen embrittlement in niobium was conducted at temperatures from 115K to 300K in alloys containing from 0.15 to 5.5 at .% hydrogen to determine the mechanism of embrittlement. In situ crack propagation studies were made in a scanning electron microscope equipped with a video tape recorder and a tensile cold stage designed for the project. Detailed fractographic studies were made in conjunction with the propagation experiments. Although necking and slip bands testify to extensive plastic deformation in the matrix, fracture surfaces exhibited complete cleavage. All characteristics of the fracture were found to be consistent with the formation of a local, brittle, stress induced niobium hydride phase at the tips of cracks above the stress free solvus temperature. The existence of this phase was confirmed by an electron diffraction structure determination and also by an ion microprobe study.

JPRS-64789 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Mechanic's Handbook on Deep Drilling,
E. A. Palashkin. 19 May 75, 48p
Trans. of mono. Spravochnik Mekhanika po Glubokomu Bureniyu, Moscow, 1974 p2-29, 539-544.

Descriptors: *Metals, *Packing materials, Handbooks, Drilling machines(Tools), Physical properties, Drilling, Translations, USSR.

The report contains a description of the fundamentals of the study of metal and nonmetal materials used in manufacturing and repairing drilling equipment.

JPRS-64965 PC$8.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Refining by Remelting,
B. E. Paton. 10 Jun 75, 286p
Trans. of Rafiniruyushchie Pereplavy (USSR) n2 p1-247 1975.

Descriptors: *Electrorefining, Electrometallurgy, Translations, USSR.
Identifiers: Remelting.

The report contains articles on the problems of producing pure and ultra-pure metals and alloys by the methods of specialized electrometallurgy including electroslag, electron beam and plasma arc refining remelting.

N75-23624/0GA PC$4.25/MF$2.25
Battelle Columbus Labs., Ohio.
Undercooling of Materials During Solidification in Space.
Final Report, Jul. 1973 - Feb. 1975.
D. P. Moak, N. M. Griesenauer, and S. H. Gelles. 18 Apr 75, 72p NASA-CR-120750
Contract NAS8-28749

Descriptors: *Cold hardening, *Low gravity manufacturing, *Space manufacturing, Containerless melts, Heat resistant alloys, Nucleation, Space laboratories, Supercooling.

For abstract, see STAR 1315

N75-23754/5GA PC$8.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Dept. of Ocean Engineering.
Analysis of Thermal Stresses and Metal Movement During Welding.
Phase Report, 14 Oct. 1970 - 21 Jun. 1973.
T. Muraki, and K. Masubuchi. 21 Jun 73, 293p NASA-CR-120757, REPT-73-16
Contracts NAS8-24365, DSR PROJ. 71648

Descriptors: *Refractory metal alloys, *Thermal stresses, *Welding, Aluminum, Computer programs, Mathematical models.

For abstract, see STAR 1315

N75-23758/6GA PC$4.75/MF$2.25
Aluminum Co. of America, Pittsburgh, Pa.
Investigation of Smooth Specimen Scc Test Procedures; Variations in Environment, Specimen Size, Stressing Frame, and Stress State.
Final Report, 1 Jul. 1969 - 29 Feb. 1972.
B. W. Lifka, D. O. Sprowls, and R. A. Kelsey. 12 May 75, 93p NASA-CR-120752
Contract NAS8-21487

Descriptors: *Aluminum alloys, *Cracking (Fracturing), *High strength alloys, *Stress corrosion, Anisotropic plates, Load tests, Shear stress, Stiffness, Submerging, Tensile stress.

For abstract, see STAR 1315

N75-23759/4GA PC$4.25/MF$2.25
Alabama Univ., Huntsville. School of Graduate Studies and Research.
Studies on Immiscible Alloys.
Semiannual Progress Report, 1 Sep. 1974 - 28 Feb. 1975.
G. H. Otto. Mar 75, 52p NASA-CR-120764, SAPR-3
Contract NAS8-27809

Descriptors: *Bismuth alloys, *Gallium alloys, *Low gravity manufacturing, *Solubility, Dispersions, Electrical resistivity, Free fall, Ice, Melting, Superconductivity.

For abstract, see STAR 1315

N75-23760/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Modified Ferritic Iron Alloys with Improved High-Temperature Mechanical Properties and Oxidation Resistance.
R. E. Oldrieve. Jun 75, 35p NASA-TN-D-7966, E-8185

Descriptors: *Heat resistant alloys, *Iron alloys, *Mechanical properties, *Oxidation resistance, Fabrication, Rupturing.

For abstract, see STAR 1315

N75-23761/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Effects of Silicon Additions on Oxidation and Mechanical Behavior of the Nickel-Base Superalloy B-1900.
R. V. Miner, Jr., and C. E. Lowell. Jun 75, 32p NASA-TN-D-7989, E-8248

Descriptors: *Heat resistant alloys, *Oxidation, *Silicon, *Thermal fatigue, Corrosion, Creep rupture strength, Mechanical properties, Metallography, Nickel alloys, Sulfation.

For abstract, see STAR 1315

N75-23773/5GA PC$3.25/MF$2.25
Aeronautical Quality Assurance Directorate, Uxbridge (England).
An Investigation of the Effect of Shot Peening on the Rotating Bending Fatigue Endurance of Chromium Plated 18% Ni Maraging Steel.
G. H. Chapman. 1974, 14p AQD/U-000667, BR42666

Descriptors: *Bending fatigue, *Fatigue life, *Maraging steels, *Shot peening, Chromium, Fatigue tests, Heat treatment, Nickel steels, Plating, Rotation, Specifications, Stress cycles, Tensile tests.

For abstract, see STAR 1315

N75-24002/8GA PC$3.25/MF$2.25
Centre National de la Recherche Scientifique, Meudon (France).
Friction of the Couples Copper-Copper, Molybdenum-Molybdenum, Copper-Molybdenum and Copper-Nickel in the Ultrahigh Vacuum Frottement des Couples Cuivre-Cuivre, Molybdene-Molybdene, Cuivre-Molybdene, et Cuivre-Nickel dans l'Ultra-Vide.
M. Barquins, D. Maugis, and R. Courtel. 1975, 18p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Copper, *Friction measurement, *Molybdenum, *Nickel, *Ultrahigh vacuum, Coefficient of friction, Couples, Oxygen, Partial pressure, Solid-solid interfaces, Temperature effects.

For abstract, see STAR 1315

N75-24031/7GA PC$4.25/MF$2.25
Technion - Israel Inst. of Tech., Haifa. Dept. of Aeronautical Engineering.
Fatigue Properties of Aircraft Lugs with Interference Fit.
A. Buch. Feb 75, 62p TAE-243

Descriptors: *Aircraft structures, *Aluminum alloys, *Fatigue tests, *Lugs, Critical loading, Fatigue life.

For abstract, see STAR 1315

PB-242 218/6GA PC$5.75/MF$2.25
Bureau of Mines, Reno, Nev. Reno Metallurgy Research Center.
Milling and Processing Tungsten.
Information circular,
J. B. Zadra. 1959, 129p BuMines-IC-7912

Descriptors: *Tungsten, Comminution, Processing, Beneficiation, Extractive metallurgy, Metalliferous minerals.

Tungsten, a comparatively new metal, is one of the important strategic war materials. In peacetime, tungsten is widely used as a filament in electric lamps and electronic tubes and is a vital constituent of some of the most important industrial alloys. High-speed tool steel containing tungsten and stellite alloys containing cobalt, chromium, and tungsten are extremely hard and resistant to corrosion. These alloys and tungsten carbides are unequaled as cutting tools and in other wear-resistant applications. They play a prominent role in the present era of mass production. Alloys containing tungsten resist oxidation at high temperatures and have been key alloys in the development of modern aircraft. The adaptability of tungsten to new uses is expanding, particularly in the high temperature range. The purpose of this report is to present the technologic status and the problems encountered in milling and processing tungsten ores. Milling and chemical treatment methods used at major tungsten processing operations are described, and flowsheets are developed.

PB-242 219/4GA PC$4.25/MF$2.25
Bureau of Mines, Denver, Colo. Intermountain Field Operation Center.
Availability of Tungsten at Various Prices from Resources in the United States.
Information circular 1971,
L. P. Larson, R. L. Lowrie, and G. R. Leland. 1971, 71p BuMines-IC-8500

Descriptors: *Tungsten, Natural resources, Availability, Abundance, Metalliferous minerals, Tungsten minerals, Metalliferous mineral deposits, Resources, Cost analysis, Extractive metallurgy, Beneficiation, Mining, United States.

The domestic supply position of tungsten, certain tungsten resources in the United States are estimated as to quantity and grade and then are systematically costed in detail (excluding exploration costs). A supply curve is developed which depicts the quantity of tungsten (WO_3) up to about 15.5 million short ton units that is producible at calculated price levels ranging from about $13 to $125 per short ton unit. About 10.4 million short ton units are available at a calculated price that is less than the present market price ($40). Total known resources amount to about 40.2 million short ton units. A very large portion of that quantity was not costed owing to inadequate information on either resources or processing methods. Further exploration and research would have a significant effect on the availability of tungsten in the United States.

PB-242 220/2GA PC$5.75/MF$2.25
Business and Defense Services Administration, Washington, D.C.
Materials Survey. Tungsten.
Dec 56, 126p BDSA-1-56

Descriptors: *Tungsten, *Metal industry, Surveys, Resources, Mining, Utilization, Availability, Production, Consumption, Marketing, Government policies, Reserves.

The report contains comprehensive information on the world tungsten industry: History, resources, mining and metallurgy, chemistry, applications and substitutions. Supply and distribution in the U.S. world production and consumption marketing--prices and specs. Government controls and policies; directory of U.S. and foreign producers, consumers, importers, and exporters. The report contains an extensive bibliography.

11H. Oils, Lubricants, and Hydraulic Fluids

AD-A011 718/4GA PC$4.75/MF$2.25
Midwest Research Inst Kansas City Mo
Performance of Lubricants: Oils and Greases in Wear Tests and Compact Materials in Ball Bearings.
Final technical rept. 2 Jan 72-31 Dec 74,
Karl R. Mecklenburg. May 75, 77p AFML-TR-75-32
Contract F33615-72-C-1374
See also report dated Apr 73, AD-768 924.

Descriptors: *Lubricants, *Ball bearings, Test methods, Test equipment, Greases, Wear resistance, Friction, Life tests, Solid lubricants.
Identifiers: Performance evaluation, Wear tests, Friction tests.

This final report for a 3-year contract contains the results of several projects conducted on the program. The first project was a long-term repeatability study on the four-ball wear testers. The work was done to assure that the two test machines were constant in performance. The data confirm that the machine performance was as constant as could be statistically expected, both from machine to machine and for each machine as a function of time. The second project was to conduct four-ball wear tests on various oils and greases to determine the ability of the lubricants to prevent wear at various conditions of speed, load, and temperature. Data from 1,320 tests on 246 materials are reported. The third and fourth projects were to determine performance lives of various greases on the Pope spindles and Navy spindle. Equipment descriptions and test results are included. The fifth project was grease testing in the Sikorsky rigs. This rig is described and test results presented. The Sikorsky rig test procedures do not appear to be well suited for research testing. The last project discussed was the long-term testing of lubricant compact materials in ball bearings.

AD-A012 074/1GA PC$4.75/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
Petroleum Lubricating Oils and Oil Additives.
13 May 75, 82p Rept no. NISC-Trans-3666
Trans. of Neftyanye Masla i Prisadki k Nim (USSR) v12 p28-58, 155-162, 210-215, 226-230, 237-240, 248-255, 320-324, 328-332 1970.

Descriptors: *Lubricating oils, *Refining, *Lubricant additives, Siloxanes, Naphthalenes, Aromatic hydrocarbons, Phenols, Adsorbents, Distillation, Adsorption, Glycols, Viscosity, Alkanes, USSR, Translations, Chemical properties, Physical properties, Aliphatic compounds, Water, Production, Synthesis(Chemistry), Sulfonic acids, Polymers, Emulsions, Contaminants.
Identifiers: Furfurals, Crude oil, Viscosity control agents, Polysiloxanes.

Contents: Two-stage refining of lubricating fractions distilled from sour and sweet crudes with phenol; Refining the lubricating fractions of paraffinic sour and sweet crude oils with phenol and furfural; Continuous refeining of lubricating oils in a moving adsorbent layer; Alkylated aromatic hydrocarbons as components of lubricating oils; Industrial production of alkylphenol oil additives VNII NP-370 and VNII NP-371; Synthesis of ashless and low-ash content additives on the basis of sulfonic acid and alkylphenols; Low molecular polymers as viscosity index improvers; Emulsifiability of oils and wearing of additives in contact with water; Viscosity of mixtures of polysiloxanes with synthetic fluids of different classes; Properties of esters of neopentyl glycols.

AD-A012 298/6GA PC$4.25/MF$2.25
Southwest Research Inst San Antonio Tex
Development of a Rotating Cylinder Deposition Test.
Interim rept. 1 Feb 72-31 Mar 75,
J. P. Cuellar, and B. B. Baber. Jun 75, 66p Rept no. SwRI-RS-629 AFAPL-TR-75-37
Contract F33615-72-C-1097

Descriptors: *Lubricants, *Aircraft engines, Test methods, Cylinders, Viscosity, Oxidation, Deposits, Performance(Engineering), Degradation.

A rotating cylinder deposition test for the evaluation of aircraft turbine engine lubricants was investigated. The device was selected for study on the basis of its promise for achieving controlled or measurable lubricant films and oxidative exposure conditions. Evaluation tests with this configuration were performed with four coded lubricants. Performance criteria in these tests included deposit rating, viscosity and neutralization number change, and oxygen consumption. Test conditions selected for this series of runs resultes in severe fluid deterioration for all but one lubricant.

N75-23988/9GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Graphite Fluoride Lubrication: The Effect of Fluorine Content, Atmosphere, and Burnishing Technique.
R. L. Fusaro. 1975, 27p NASA-TM-X-71733, E-7492
Conf-Proposed for Presentation at the Lubrication Conf., Miami, Fla., 21-23 Oct. 1975; Sponsored by Asme and Amer. Soc. Of Lubrication Engr.

Descriptors: *Atmospheric effects, *Carbon compounds, *Fluorides, *Solid lubricants, Atmospheric temperature, Moisture content, Service life.

For abstract, see STAR 1315

N75-23990/5GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Effect of Longitudinal Surface Finish on Elastohydrodynamic Lubrication.
T. A. Dow, J. W. Kannel, and R. J. Parker. Jun 75, 37p NASA-TN-D-7967, E-7971

Descriptors: *Elastohydrodynamics, *Lubrication, *Surface finishing, Esters, Film thickness, Paraffins, Roller bearings, X ray analysis.

For abstract, see STAR 1315

N75-23991/3GA PC$5.25/MF$2.25
Imperial Coll. of Science and Technology, London (England). Lubrication Lab.

The Background to Current Theories of Scuffing.
P. B. Macpherson. 1974, 109p S/T-MEMO-5/73, BR33386
Subm-Sponsored by Min. Of Defence Prepared for Westland Helicopters LTD., Yeovil, Engl.

Descriptors: *Boundary lubrication, *Elastohydrodynamics, *Failure analysis, *Sliding friction, Friction reduction, Lubricating oils, Oil additives, Self lubricating materials, Self lubrication, Wear.

For abstract, see STAR 1315

N75-23997/0GA PC$3.75/MF$2.25
British Petroleum Co., Ltd., Sunbury-on-Thames (England).
Development of New Space Lubricants.
G. C. Friend, A. J. Groszek, W. A. Ware, and M. Warwick. 1975, 29p
Subm-Prepared Jointly with Rae and Marconi Space and Defence Systems LTD. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Lubricating oils, *Satellite antennas, *Spacecraft lubrication, Greases, Mechanical drives, Spin reduction, Ultrahigh vacuum, Wear tests.

For abstract, see STAR 1315

N75-23998/8GA PC$3.25/MF$2.25
Cambridge Univ. (England). Cavendish Lab.
The Friction and Wear of Self Lubricating Polythenes.
B. J. Briscoe, and D. Tabor. 1975, 22p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Friction measurement, *Polyethylenes, *Self lubricating materials, *Wear tests, Additives, Fillers, Polypropylene, Polytetrafluoroethylene.

For abstract, see STAR 1315

N75-24507/6GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Morphological Growth of Sputtered MOS2 Films.
T. Spalvins. 1975, 19p NASA-TM-X-71742
Conf-Proposed for Presentation at Lubrication Conf., Miami Beach, Fla.; Sponsored by AM. Soc. Of Lubrication Engr. And Asme.

Descriptors: *Films, *Glass, *Metal surfaces, *Molybdenum sulfides, *Sputtering, Adhesion, Surface finishing, Surface temperature.

For abstract, see STAR 1315

PATENT-3 536 624 Not available NTIS
Department of the Air Force Washington D C
Grease Compositions of Fluorocarbon Polyethers Thickened with Polyfluorophenylene Polymers.
Patent,
John B. Christian, and Christ Tamborski. Filed 8 May 68, patented 27 Oct 70, 3p Rept nos. PAT-APPL-727 671,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Greases, *Patents, Fluorinated hydrocarbons, Ethers, Fluoropolymers, Thickeners(Materials).
Identifiers: Polyethers, Poly(phenylene/tetrafluoro), PAT-CL-252-54, *Halocarbon resins.

The patent comprises grease formulations of by weight seventy-eight to eighty percent fluorocarbon polyethers with thickener twenty to twenty-two percent polyfluorophenylene stable to 550F.

PATENT-3 801 609 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Substituted Fatty Acid Amide Lubricants.
Patent,
Frank C. Magne, Robert R. Mod, Gene Sumrell, and Winfred E. Parker. Filed 6 Apr 73, patented 2 Apr 74, 4p PAT-APPL-348 804,
Supersedes PB-230 658.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Extreme pressure additives, *Amides, Sulfur organic compounds, Extreme pressure lubricants, Aliphatic compounds, Fatty acids, Synthesis(Chemistry), Performance, Morpholines, Physical properties, Wear inhibitors.
Identifiers: PAT-CL-260-402-5, Epithio compounds, *Stearamides.

This invention relates to N-acylmorpholines and N-mono and N,N-disubstituted fatty acid amides and to similar derivatives of epithioamides which are useful as base and extreme pressure lubricants and additives. Particularly, the compound N-(ethoxyethoxyethoxy)propyl-9(10)-mercaptostearamide is claimed.

PATENT-3 809 706 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Substituted Fatty Acid Amide Lubricants.
Patent,
Frank C. Magne, Robert R. Mod, Gene Sumrell, and Winfred E. Parker. Filed 6 Apr 73, patented 7 May 74, 4p PAT-APPL-348 802,
Supersedes PB-230 244. Previously filed as PAT-APPL-176 734, 31 Aug 71.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Amides, *Extreme pressure additives, *Lubricants, Aliphatic compounds, Phosphorus organic compounds, Extreme pressure lubricants, Morpholines, Synthesis(Chemistry), Physical properties.
Identifiers: PAT-CL-260-403, *Stearamides.

This invention relates to N-acylmorpholines and N-mono and N,N-disubstituted fatty acid amides and to similar derivatives of epithioamides which are useful as base and extreme pressure lubricants and additives. Particularly, the compound N,N-dibutyl-9(10)-(dibutylphosphono)stearamide useful as a lubricant base is claimed.

PATENT-3 846 449 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Substituted Fatty Acid Amide Lubricants.
Patent,
Frank C. Magne, Robert Mod, Gene Sumrell, and Winfred E. Parker. Filed 6 Apr 73, patented 5 Nov 74, 7p PAT-APPL-348 823,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Amides, *Extreme pressure additives, Aliphatic compounds, Synthesis(Chemistry), Alkoxy compounds.
Identifiers: PAT-CL-260-327-E, *Epithio compounds.

This invention relates to N-acylmorpholines and N-mono and N,N-disubstituted fatty acid amides and to similar derivatives of epithioamides which are useful as base and extreme pressure lubricants and additives. The authors specifically claim N,N-dibutyl-9,10-epithiostearamide, N,N-dibutyl-9,10-12,13-diepithiostearamide, and N-(ethoxyethoxyethoxy)propyl-9,10-epithiostearamide.

PATENT-3 849 321 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Substituted Fatty Acid Amide Lubricants.
Patent,
Frank C. Magne, Robert R. Mod, Gene Sumrell, and Winfred E. Parker. Filed 6 Apr 73, patented 19 Nov 74, 8p PAT-APPL-348 801,
Supersedes PB-229 957.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Extreme pressure additives, *Patents, *Amides, *Morpholines, Synthesis(Chemistry), Extreme pressure lubricants, Aliphatic compounds, Wear inhibitors, Sulfur organic compounds.
Identifiers: Epithio compounds, PAT-CL-252-46-7.

This invention relates to N-acylmorpholines and N-mono and N,N-disubstituted fatty acid amides and to similar derivatives of epithioamides which are useful as base and extreme pressure lubricants and additives.

PATENT-3 849 454 Not available NTIS
Department of Agriculture, Washington, D.C.
N-Substituted Fatty Acid Amide Lubricants.
Patent,
Frank C. Magne, Robert R. Mod, Gene Sumrell, and Winfred E. Parker. Filed 6 Apr 73, patented 19 Nov 74, 5p PAT-APPL-348 803,
Supersedes PB-230 657.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Patents, *Extreme pressure additives, *Amides, Physical properties, Morpholines, Aliphatic compounds, Extreme pressure lubricants, Phosphorus organic compounds, Synthesis(Chemistry), Wear inhibitors.
Identifiers: *Stearamides, PAT-CL-260-403.

This invention relates to N-acylmorpholines and N-mono and N,N-disubstituted fatty acid amides and to similar derivatives of epithioamides which are useful as base and extreme pressure lubricants and additives. In particular, the compound N,N-dibutyl-(9(10)hydroxy-(9)10-dibutylphosphato)stearamide is claimed.

11L. Wood and Paper Products

AD-A012 007/1GA PC$3.75/MF$2.25
Forest Products Lab Madison Wis
Inhibition of Cellulases of Wood-Decay Fungi.
Forest Service Research paper,
Terry L. Highley. 1975, 10p Rept no. FSRP-FPL-247

Descriptors: *Cellulose, *Enzyme inhibitors, *Wood, *Fungi, Phenols, Chelating agents, Oxidizers, Plant tissue, Oxidation reduction reactions, Heavy metals, Enzymes, Thiols, Decay, Mercury compounds, Degradation.
Identifiers: Cellulases, *Coriolus versicolor, *Ganoderma applanaium, *Poria moticola, *Gloeophyllum trabeum, Plant extracts.

The effects of classic enzyme inhibitors, phenols, and extracts from wood on activity of cellulases from two brown-rot and two white-rot fungi were investigated. The cellulases from the fungi varied in their tolerances to the inhibitors. This suggested structural differences in

the enzymes. C sub x cellulases, which break down soluble cellulose, were not inhibited in any of the fungi by sulfhydryl-binding compounds and metal-complexing agents. Thus, sulfhydryl groups apparently are not an active site of C sub x, and the enzyme does not require metal. Most phenols inhibited cellulase only when oxidized, and generally inhibited C sub x of the white-rot fungi more than C sub x of the brown-rot fungi. The purpose of the study is to investigate the inhibition of cellulases from wood-decaying fungi by using the following: classical enzyme inhibitors, phenolics, and extracts from wood.

AD-A012 209/3GA PC$4.75/MF$2.25
Forest Products Lab Madison Wis
Properties of Major Southern Pines: Part I: Wood Density Survey. Part II: Structural Properties and Specific Gravity.
Forest Service research paper,
H. E. Wahlgren, D. R. Schumann, B. A. Bendtsen, R. L. Ethington, and W. L. Galligan. 1975, 81p Rept nos. FSRP-FPL-176, FSRP-FPL-177
Supersedes report dated 1972, AD-748 026.

Descriptors: *Wood, *Density, *Structural properties, *Specific gravity, Trees, Surveys, Volume, Weight, Tables(Data), Regression analysis, Sampling, Oklahoma, Texas.
Identifiers: *Southern pines, *Pine wood, Pinus taeda, Pinus echinata, Pinus palustris, Pinus elliottii, Atlantic Coast Region(United States).

The primary purpose of the publication is to provide interested state, private, and Federal agencies the most complete and up-to-date information ever assembled on the specific gravity of the four major southern pines--loblolly (Pinus taeda), shortleaf (P. echinata), longleaf (P. palustris), and slash (P. elliottii), pine. In this report specific gravity is given for clear wood obtained on the basis of green volume and ovendry weight. The specific gravity data were summarized from extensive sampling in 11 southern states--extending from the Atlantic Coast westward to about the 96th meridian in Oklahoma and Texas.

AD-A012 226/7GA PC$3.25/MF$2.25
Forest Products Lab Madison Wis
Cutting Wood Materials by Laser.
Forest Service research paper,
C. C. Peters, and H. L. Marshall. 1975, 13p Rept no. FSRP-FPL-250
Prepared in cooperation with GTE Sylvania, Inc., Mountain View, Calif.

Descriptors: *Wood, *Cutting tools, *Gas lasers, Cutting, Lumber, Plywood, Combustion, Vaporization.
Identifiers: *Particleboard.

Laser technology is undergoing unbelievably rapid expansion. To evaluate the ability of the laser for cutting wood and wood products, a 250-watt industrial type continuous carbon dioxide laser was used. The wood materials included green and dry lumber, plywood, and particleboard. The cutting phenomena changed from a zone of clean instantaneous vaporization for the first 1/16-inch of depth to a charring condition for the balance of the thickness cut.

12. MATHEMATICAL SCIENCES

12A. Mathematics and Statistics

AD-A011 739/0GA PC$3.25/MF$2.25
Michigan Univ Ann Arbor Dept of Electrical Engineering
Linear Systems with Multiplicative Control,
W. A. Porter, and R. M. DeSantis. 15 Oct 73, 11p AFOSR-TR-75-0635
Grant AF-AFOSR-2427-73
Availability: Pub. in International Jnl. of Control, v20 n2 p257-266 1974.

Descriptors: *Hilbert space, Operators(Mathematics), Linear systems, Conformal mapping, Multiplication factor, Reprints.

Bilinear operators on Hilbert Resolution spaces provide the setting for the analysis of linear systems with multiplicative control. Recent results on the solution of certain strictly causal linear operator equations are brought to bear in the bilinear setting. In the process a close similarity to resolvant properties of convention spectral theory is utilized. The results are interpreted in a systems context through a series of examples. (Author)

AD-A011 769/7GA PC$4.75/MF$2.25
Lockheed Missiles and Space Co Inc Sunnyvale Calif
Problem Controlled Grid Generation for the Numerical Solution of Partial Differential Equations,
Paul S. Jensen, Francis A. Brogan, and Carlos A. Felippa. 27 May 75, 81p Rept no. LMSC-D469784 AFOSR-TR-75-0811
Contract F44620-71-C-0109

Descriptors: *Partial differential equations, *Numerical integration, *Computer programming, Finite difference theory, Finite element analysis, Approximation, Eigenvectors, Algorithms, Boundary value problems.
Identifiers: STAGS computer program, FIDAG computer program, *Elliptic differential equations.

Conventional finite element analysis of elliptic partial differential equations involves the establishment of a discretization grid on which an energy functional is defined and minimized. By including the positions of the grid nodes as unknowns in the energy functional, one can obtain the optimum placement of the nodes as well as the equation solution from the energy minimization. The potential of Chebyshev iterate acceleration in the inverse iteration eigensolution process has long been understood but not realized in practical applications. Its potential is readily realized in the sectioning algorithm by virtue of the fixed interval over which analysis is made.

AD-A011 801/8GA PC$3.25/MF$2.25
Syracuse Univ N Y Dept of Electrical and Computer Engineering
Paley, Hadamard, and Walsh Functions: Interrelationships and Transconversions.
Interim rept.,
David K. Cheng, and James J. Liu. May 75, 24p AFOSR-TR-75-0812
Grant AF-AFOSR-2809-75

Descriptors: *Walsh functions, Matrices(Mathematics), Recursive functions, Signal processing, Algorithms.
Identifiers: *Paley functions, *Hadamard functions, *Rademacher functions.

Paley, Hadamard, and Walsh functions are binary-valued functions which form a complete orthonormal set on the interval (0< or = xc1). All of them have been referred to as Walsh functions in the literature, leading to considerable confusion in nomenclature. This report defines and differentiates Paley, Hadamard, and Walsh functions from their expressions as products of Rademacher functions. Their interrelationships and the procedures for converting one function to another are discussed. Methods for determining the sequency from the order of a Paley function and of a Hadamard function are explained. An algorithm providing a simple way for obtaining the sequency vector of high-order Hadamard transform matrices is developed.

AD-A011 816/6GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
Finite Difference Approximations and Their Stencil Forms of Poisson's Equation in Cylindrical Coordinates.
Memorandum rept.,
John G. Siambis, Roswell Lee, and Shyke A. Goldstein. May 75, 18p Rept no. NRL-MR-3054

Descriptors: *Partial differential equations, *Finite difference theory, Numerical integration, Computer applications, Computations, Approximation(Mathematics), Taylors series.
Identifiers: *Poisson equation.

A systematic method is presented for finding finite difference approximations and their stencil representation of Poisson type second order partial differential equations in two variables for the purpose of obtaining accurate numerical solutions of these equations. The method uses a Taylor series expansion for the unknown function and its relationship to the known source function. The case of cylindrical coordinates with rectangular meshes is emphasized. Two known and two new stencils are presented. Modifications to stencils adjacent to physical boundaries are considered.

AD-A011 832/3GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
On Subgraph Number Independence in Trees,
R. L. Graham, and E. Szemeredi. Mar 75, 19p Rept no. STAN-CS-75-484
Grant NSF-GJ-36473

Descriptors: *Graphics, Network flows, Theorems.
Identifiers: *Graph theory, *Trees(Mathematics).

AD-A011 833/1GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
Regular Partitions of Graphs,
E. Szemeredi. Apr 75, 11p Rept no. STAN-CS-75-489
Grant NSF-GJ-36473

Descriptors: *Graphics, Set theory, Theorems.
Identifiers: *Graph theory, *Partitions(Mathematics).

A crucial lemma in recent work of the author (showing that k-term arithmetic progression-free sets of integers must have density zero) stated (approximately) that any large bipartite graph can be decomposed into relatively few 'nearly regular' bipartite subgraphs. In this note the author generalizes this result to arbitrary graphs, at the same time strengthening and simplifying the original bipartite result.

AD-A011 834/9GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
On Multiplicative Representations of Integers,
P. Erdos, and E. Szemeredi. Mar 75, 19p Rept no. STAN-CS-75-485
Grant NSF-GJ-36473

Descriptors: *Number theory, Prime numbers, Sequences(Mathematics), Theorems.
Identifiers: Integers.

AD-A011 835/6GA PC$3.25/MF$2.25
Stanford Univ Calif Dept of Computer Science
On Packing Squares with Equal Squares,
P. Erdos, and R. L. Graham. Mar 75, 11p Rept no. STAN-CS-75-483
Grant NSF-GJ-36473

Descriptors: *Convex sets, *Packaging, Theorems.
Identifiers: Polygons, Squares(Geometry).

The following problem arises in connection with certain multidimensional stock cutting problems: How many non-overlapping open unit squares may be packed into a large square of side alpha. Of course, if alpha is a positive integer, it is trivial to see that alpha squared unit squares can be successfully packed. However, if alpha is not an integer, the problem becomes much more complicated. Intuitively, one feels that for alpha = N + 1/100, say, (where N is an integer), one should pack N squared unit squares in the obvious way and surrender the uncovered border area (which is about alpha/50) as unusable waste. After all, how could it help to place the unit squares at all sorts of various skew angles. In this note, the authors show how it helps. In particular, the authors prove that one can always keep the amount of uncovered area down to at most proportional to alpha sup(7/11), which for large alpha is much less than the linear waste produced by the 'natural' packing above.

AD-A011 837/2GA PC$4.75/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Acceleration of Series,
R. W. Gosper. Mar 74, 93p Rept no. AI-M-304
Contract N00014-70-A-0362-0005

Descriptors: *Series(Mathematics), *Computations, Convergence, Acceleration, Computer applications, Algorithms.

The rate of convergence of infinite series can be accelerated by a suitable splitting of each term into two parts and then combining the second part of the n-th term with the first part of the (n+1)-th term to get a new series and leaving the first part of the first term as an 'orphan'. Repeating this process an infinite number of times, the series will often approach zero, and one obtains the series of orphans, which may converge faster than the original series. Heuristics for determining the splits are given.

AD-A011 901/6GA PC$3.25/MF$2.25
Pittsburgh Univ Pa Dept of Mathematics
A Continuous Bivariate Exponential Extension,
Henry W. Block, and A. P. Basu. Jul 73, 10p
AFOSR-TR-75-0888
Grant AF-AFOSR-2352-72
Availability: Pub. in Jnl. of the American Statistical Association, v69 n348 p1031-1037 Dec 74.

Descriptors: *Exponential functions, *Distribution functions, *Bivariate analysis, Reliability, Random variables, Statistical distributions, Reprints.
Identifiers: LMP(Loss of memory property), Loss of memory property.

Two derivations are given for an absolutely continuous bivariate extension of the exponential distribution. This distribution turns out to be the absolutely continuous part of the bivariate exponential distribution of Marshall and Olkin and a variant of the bivariate exponential extension of Freund. One derivation utilizes the loss of memory property (LMP) which Marshall and Olkin used to derive their bivariate exponential distribution. Distributional properties, reliability considerations and estimation for this distribution are discussed. Further, the LMP is characterized for absolutely continuous bivariate random variables (X, Y) through the independence of min (X, Y) and X - Y. (Author)

AD-A011 911/5GA PC$3.25/MF$2.25
Kentucky Univ Lexington Dept of Statistics
Robustness of Stein's Two-Stage Procedure for Mixtures of Normal Populations.
Technical rept.,
Saul Blumenthal, and Z. Govindarajulu. Oct 74, 22p
Contract N00014-73-A-0385-0001

Descriptors: *Sampling, *Normal density functions, Random variables, Analysis of variance, Confidence limits, Statistical tests.
Identifiers: Robust procedures.

Explicit expressions for the level of significance and power of Stein's two-stage hypothesis testing procedure are derived when the normal population is mixed with another normal population differing in the mean. Approximate expansions for these expressions have been obtained, and numerical studies of the size have been carried out using the expansions. Some numerical indication of the accuracy of the approximations has also been obtained. It is surmised that Stein's two-stage procedure is quite robust against mixtures of normal populations differing in location parameters. Similar conclusions can be drawn regarding the coverage probabilities of confidence intervals generated by this procedure.

AD-A011 912/3GA PC$3.75/MF$2.25
Case Western Reserve Univ Cleveland Ohio Dept of Mathematics and Statistics
Problems and Approaches in Design of Experiments for Estimation and Testing in Non-Linear Models.
Technical rept.,
S. Zacks. 30 Jun 75, 37p Rept no. TR-21
Contract N00014-67-A-0404-0009

Descriptors: *Experimental design, Distribution functions, Random variables, Bayes theorem, Exponential functions, Estimates.

AD-A011 921/4GA PC$3.75/MF$2.25
Yale Univ New Haven Conn Becton Center
On the Uniform Asymptotic Stability of Certain Linear Non-Autonomous Differential Equations.
Technical rept.,
A. P. Morgan, and K. S. Narendra. May 75, 29p
Rept no. CT-64
Contract N00014-67-A-0097-0020
Report on Control Theory.

Descriptors: *Control theory, Linear differential equations, Asymptotic series, Stability, Matrices(Mathematics), Theorems.
Identifiers: Asymptotic stability.

The ordinary differential equation dx/dt = -P(t)x where P(t) is symmetric positive semi-definite time-varying matrix arises often in mathematical control theory. In this paper the authors consider the stability properties (in the sense of Lyapunov) of the equilibrium state x(t) identically equal to 0. It is a relatively trivial exercise to show that the origin is stable but (uniform) asymptotic stability does not generally hold unless P(t) is positive definite. The semi-definite case arises much more frequently in practice than the definite one and the main effort in this paper is directed towards finding conditions implying uniform asymptotic stability in such a case.

AD-A011 926/3GA PC$3.25/MF$2.25
Carnegie-Mellon Univ Pittsburgh Pa Dept of Computer Science
O((n log n)sup 3/2) Algorithms for Composition and Reversion of Power Series.
Interim rept.,
R. P. Brent, and H. T. Kung. May 75, 11p
Contract N00014-67-A-0314-0010, Grant NSF-GJ-32111
Prepared in cooperation with Australian National Univ., Canberra. Computer Centre.

Descriptors: *Power series, *Computations, Polynomials, Algorithms, Theorems, Fourier transformation.
Identifiers: Fast Fourier transform.

AD-A011 927/1GA PC$3.25/MF$2.25
Carnegie-Mellon Univ Pittsburgh Pa Dept of Computer Science
The Use of Integrals in the Solution of Nonlinear Equations in N Dimensions.
Interim rept.,
B. Kacewicz. Jun 75, 18p
Contract N00014-67-A-0314-0010, Grant NSF-GJ-3211

Descriptors: *Banach space, *Integral equations, Approximation, Interpolation, Iterations, Nonlinear systems, Convex sets.

The author considers the problem of solving the nonlinear equation F(x) = 0, where F: D (arrow) B sub 2, D is an open convex subset of B sub 1 and B sub 1, B sub 2 are Banach spaces, dim(B sub 1) = dim(B sub 2) = N, 1 = or < N = or < + infinity.

AD-A011 955/2GA PC$3.25/MF$2.25
California Univ Los Angeles
Harmonic L(P)-Functions on Riemannian Manifolds,
Leo Sario, and Cecilia Wang. 17 Jul 73, 9p ARO-9653.54-M
Grant DA-ARO-D-31-124-73-G39
Availability: Pub. in Kodai Mathematical Seminar Reports, v26 n2/3 p204-209 Mar 75.

Descriptors: *Harmonic analysis, Green's function, Inequalities, Reprints.
Identifiers: Riemannian manifolds.

AD-A011 966/9GA PC$3.25/MF$2.25
Rochester Univ N Y
Speed and Quality of Random Numbers for Simulation,
Edward J. Dudewicz. 1975, 12p ARO-10003.25-M
Grant DA-ARO-D-31-124-72-G55
Availability: Pub. in Annual Technical Conference Transactions of the American Society for Quality Control, v29 p170-180 1975.

Descriptors: *Real numbers, *Statistical distributions, Monte carlo method, Computerized simulation, Computer applications, Reprints.
Identifiers: Random numbers.

Simulation and Monte Carlo studies play an important and ever more significant role in business, and such studies often consume large amounts of computer time. Hence, quality and speed are considerations of prime importance with regard to random numbers used in such studies. A number of random number sources have been tested for quality and speed, and the implications of the results for users of simulation methodology are given. (Author)

AD-A011 967/7GA PC$3.25/MF$2.25
Rochester Univ N Y
Chi-Square Percentage Points for Chi-Square Distribution Testing of Chi-Square Values, with an Application to Random Number Generators,
Edward J. Dudewicz. 1975, 7p ARO-10003.24-M
Grant DA-ARO-D-31-124-72-G55
Availability: Pub. in Proceedings of the Computer Science and Statistics, Annual Symposium on the Interface (8th), p217-221 1975.

Descriptors: *Statistical distributions, *Statistical tests, Random variables, Interpolation, Approximation(Mathematics), Number theory, Degrees of freedom, Reprints.
Identifiers: Chi square distributions.

AD-A012 013/9GA PC$3.75/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Adaptive Sequential Estimation with Unknown Noise Statistics.
Math Lab preprint series no. 7 (Final),

Kenneth A. Myers. Jan 75, 29p Rept no. ARL-75-0215

Descriptors: *Control theory, *Kalman filtering, Sequential analysis, White noise, Stochastic processes, Linear systems, Mathematical models, Orbits, Adaptive systems.
Identifiers: Estimation theory, CDC 6600 computers, Spacecraft trajectories.

Sequential algorithms are derived for suboptimal adaptive estimation of the unknown state and observation noise statistics simultaneously with the system state. First- and second-order moments of the noise processes are estimated based on noise samples generated from quantities in the usual Kalman filter algorithm. A limited memory formulation is developed for adaptive correction of the a priori statistics which are intended to compensate for time-varying model errors. The new estimators are applied to an orbit determination problem for a near-earth satellite with significant modeling errors. Results indicate that improved state estimates can be obtained at little computational expense when erroneous a priori noise statistics are adaptively corrected in the filter algorithm.

AD-A012 014/7GA PC$3.25/MF$2.25
California Univ Irvine Systems Engineering and Operations Research Group
Optimal Regulation of Stochastic Linear Systems with Adjustable Parameters,
R. F. Roberts, and J. S. Meditch. Apr 75, 17p Rept no. SEOR-75-1 AFOSR-TR-75-0909
Grants AF-AFOSR-2116-71, NSF-GK-39735

Descriptors: *Control theory, *Nonlinear programming, Linear systems, Stochastic processes, Algorithms, Theorems.
Identifiers: Stochastic control.

The problem of optimal regulation for stochastic linear systems with adjustable plant parameters is examined and posed as a nonlinear programming problem. A computational procedure, built around the Generalized Reduced Gradient algorithm, is developed to solve the associated plant-controller design problem. The procedure is illustrated via a lateral autopilot design in which the quality of regulation is improved by approximately 18% over that achievable with a nominal fixed plant.

AD-A012 017/0GA PC$3.25/MF$2.25
Colorado State Univ Fort Collins Dept of Mathematics
Baer Subdesigns of Symmetric Balanced Incomplete Block Design,
R. C. Bose, and S. S. Shrikhande. 1975, 22p AFOSR-TR-75-0870
Grant AF-AFOSR-2364-72
Prepared in cooperation with Bombay Univ. (India).

Descriptors: *Experimental design, Matrices(Mathematics), Theorems.
Identifiers: *Block design, Baer design.

AD-A012 018/8GA PC$3.25/MF$2.25
California Univ Irvine School of Engineering
On the Use of Observers for Interpolation,
James S. Meditch. Nov 74, 9p AFOSR-TR-75-0840
Grants AF-AFOSR-2116-71, NSF-GK-39735
Proceedings of the 1974 IEEE Conference on Decision and Control including Symposium on Adaptive Processes(13th) 20-22 Nov 74, Phoenix, Ariz.

Descriptors: *Control theory, Linear systems, Interpolation, Real time, Feedback, Meetings.
Identifiers: Feedback control.

Preliminary results are presented on the use of observers for interpolation in constant-coefficient, linear, dynamic systems. Two sequential algorithms, which are termed fixed-point and fixed-lag interpolators and can be implemented to operate in real time, are developed. Extensions to noisy dynamic systems and to reduced-order interpolators, and implications in feedback control are noted.

AD-A012 019/6GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge
Algebraic Structure and Finite Dimensional Nonlinear Estimation,
Steven I. Marcus, and Alan S. Willsky. 1975, 10p AFOSR-TR-75-0910
Grants AF-AFOSR-2273-72, NSF-GK-42090

Descriptors: *Control theory, Nonlinear systems, Linear systems, Stochastic processes, Partial differential equations, Theorems, Computations.
Identifiers: *Nonlinear estimation, Stochastic control, Lie algebras.

Optimal recursive state estimators have been derived for very general classes of nonlinear stochastic systems. The optimal estimator requires, in general, an infinite dimensional computation to generate the conditional mean of the system state given the past observations. This computation involves either the solution of a stochastic partial differential equations for the conditional density or an infinite set of coupled ordinary stochastic differential equations for the conditional moments. However, the class of linear stochastic systems with linear observations and white Gaussian plant and observation noises has a particularly appealing structure, because the optimal state estimator consists of a finite dimensional linear system -- the Kalman-Bucy filter. In this paper the authors exploit the algebraic structure of certain other classes of systems, in order to prove that the optimal estimators for these systems are finite dimensional.

AD-A012 042/8GA PC$3.25/MF$2.25
Technology Inc Dayton Ohio
Asymptotic Distribution of the Determinants of Some Random Matrices.
Journal article,
A. K. Gupta, A. K. Chattopadhyay, and P. R. Krishnaiah. Apr 74, 17p ARL-75-0121
Contract F33615-71-C-1463
Availability: Pub. in Communications in Statistics, v4 n1 p33-47 1975.

Descriptors: *Multivariate analysis, Determinants(Mathematics), Random variables, Statistical distributions, Degrees of freedom, Reprints.

In this paper, the authors derived the asymptotic distributions of the ratios of the determinants of multivariate quadratic forms. Also, the authors derived the joint distribution of the ratios of the determinants of the Wishart matrices with a common denominator. These results are useful in studying the robustness of certain multivariate analysis of variance tests. (Author)

AD-A012 053/5GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
On Boundary Layer Problems Exhibiting Resonance,
Bernard J. Matkowsky. 20 May 74, 19p Rept no. SI-21
Contract N00014-67-A-0467-0027, Grant NSF-GP-33679
Errata sheet inserted.
Availability: Pub. in SIAM Review, v17 n1 p82-100 Jan 75.

Descriptors: *Boundary value problems, Resonance, Boundary layer, Differential equations, Perturbations, Anomalies, Expansion, Approximation(Mathematics), Reprints.
Identifiers: Singular perturbation, Expansions(Mathematics), Turning points.

This report considers singularly perturbed boundary value problems for differential equations of the form $\epsilon y'' + f(x;\epsilon)y' + g(x,\epsilon)y = h(x,\epsilon)$, where f changes sign at one or more points in the interval under consideration. Such points are sometimes referred to as turning points. It is shown that various anomalies can occur in such problems. One of these anomalies is the phenomenon of resonance. Criteria are presented for resonance to occur, and to derive uniformly valid asymptotic expansions for the solution of such problems.

AD-A012 058/4GA PC$3.25/MF$2.25
System Development Corp Santa Monica Calif
Estimation of Weibull Parameters from Two-Order Statistics.
Journal article,
V. K. Murthy, and G. B. Swartz. May 73, 9p ARL-75-0206
Contract F33615-70-C-1183, Grant NSF-GJ-913
Availability: Pub. in Jnl. of the Royal Statistical Society, Series B, v37 n1 p96-102 1975.

Descriptors: *Statistical samples, *Weibull density functions, Distribution functions, Random variables, Confidence limits, Reprints.

The use of a computationally simple statistic for estimating, from small samples, the important reciprocal-shape parameter, gamma, of the Weibull distribution is described. The estimator uses two suitably selected order statistics from a sample of N failure times. The choice of the two has been made to minimize the variance of the estimator; however, concise formulae are given to permit the use of any two order statistics in the case of censored samples. The statistic is unbiased, its efficiency relative to the Cramer-Rao bound appears to approach 70 per cent and its exact distribution function is given. The statistic is applied to hypothesis tests of the reciprocal-shape parameter when the location parameter is unknown. The relationship between this test and other tests for Weibull parameters are discussed in the Introduction. (Author)

AD-A012 130/1GA PC$3.25/MF$2.25
California Univ Berkeley Dept of Electrical Engineering and Computer Sciences
Instability of Nonlinear Infinite-Dimensional Feedback Systems Using Lyapunov Functionals,
T. Steding, and A. Bergen. 13 May 71, 17p AFOSR-TR-75-0880
Grant AF-AFOSR-1488-68
Availability: Pub. in SIAM Jnl. of Control, v12 n4 p664-678 Nov 74.

Descriptors: *Lyapunov functions, *Feedback, Instability, Nonlinear systems, Passive systems, Linear systems, Active systems, Global, Operators(Mathematics), Reprints.

Sufficient conditions are given for the L2 instability of a broad class of nonlinear, time-varying feedback systems. The system under consideration is assumed to be decomposed into two subsystems; one passive and nonlinear, not necessarily memoryless, and the other unstable and linear, not necessarily finite-dimensional. The main results essentially state that the feedback system is unstable if the linear subsystem is strictly passive and bounded on a proper subset of L2. The results apply both to instability in the input-output sense and to instability of unforced systems. The principal conceptual tools of the analysis are a Lyapunov function and a state, both of which are defined on the linear subsystem in a manner not depending on the dimensionality of the system. As an application of these results, an instability counterpart to the circle criterion is presented which applies to a class of systems more general than those of

previous results. The conditions of this counterpart imply, in addition to L2 instability, global state space instability. Conditions are also given under which the Lyapunov function defined in the analysis may be used to establish asymptotic stability in the large. (Author)

AD-A012 131/9GA PC$3.25/MF$2.25
California Univ Santa Barbara Dept of Mathematics
Normal and Hermitian Tensor Products,
Marvin Marcus, and Dean W. Hoover. 8 May 73, 9p AFOSR-TR-75-0893
Grant AF-AFOSR-2164-72
Availability: Pub. in Linear Algebra and its Applications, v9 p1-8 1974.

Descriptors: *Linear algebra, Tensor analysis, Matrices(Mathematics), Symmetry, Reprints.
Identifiers: Eigenvalues.

AD-A012 132/7GA PC$3.25/MF$2.25
California Univ Santa Barbara Dept of Mathematics
Linear Transformations on Nonnegative Matrices,
Henryk Minc. 4 Oct 73, 6p AFOSR-TR-75-0891
Grant AF-AFOSR-2164-72
Availability: Pub. in Linear Algebra and its Applications, v9 p149-153 1974.

Descriptors: *Mapping(Transformations), *Matrices(Mathematics), Eigenvectors, Linear algebra, Reprints.

AD-A012 133/5GA PC$3.25/MF$2.25
California Univ Santa Barbara Dept of Mathematics
The Eigenvalues of a Partitioned Hermitian Matrix Involving a Parameter,
R. C. Thompson. 13 Sep 73, 19p AFOSR-TR-75-0892
Grant AF-AFOSR-2164-72
Availability: Pub. in Linear Algebra and its Applications, 9 p243-260 1974.

Descriptors: *Matrices(Mathematics), Eigenvectors, Inequalities, Polynomials, Reprints.

Asymptotic growth rates are obtained for the eigenvalues of a partitioned Hermitian matrix having positive definite and negative definite complementary principal submatrices, when the nonprincipal submatrix grows indefinitely large. (Author)

AD-A012 134/3GA PC$3.25/MF$2.25
California Univ Santa Barbara Dept of Mathematics
An Unresolved Conjecture on Permanents of (0, 1)-Matrices,
Henryk Minc. 15 Feb 73, 18p AFOSR-TR-75-0890
Grant AF-AFOSR-2164-72
Availability: Pub. in Linear and Multilinear Algebra, v2 p97-113 1974.

Descriptors: *Matrices(Mathematics), *Linear algebraic equations, Theorems, Inequalities, Reprints.

AD-A012 139/2GA PC$3.25/MF$2.25
Wisconsin Univ Madison Dept of Statistics
Correcting Inhomogeneity of Variance with Power Transformation Weighting,
George E. P. Box, and William J. Hill. Oct 72, 6p AFOSR-TR-75-0883
Grant AF-AFOSR-2363A-72
Availability: Pub. in Technometrics, v16 n3 p385-389 Aug 74.

Descriptors: *Least squares method, Transformations(Mathematics), Analysis of variance, Kinetics, Bayes theorem, Reprints.

A method is presented for using power transformation weights in least squares analysis to account for inhomogeneity of variance. The need for this form of weighting is common. In particular, it frequently arises when, as is illustrated with an example, a linearized kinetic rate expression is analyzed.

AD-A012 216/8GA PC$3.75/MF$2.25
Florida State Univ Tallahassee Dept of Statistics
Bahadur Efficiencies of the Student's t Tests.
Technical rept.,
Douglas H. Jones, and Jayaram Sethuraman. Mar 75, 27p Rept no. FSU-TR-M334 ARO-10530.14-N
Grant DAHC04-74-G-0188
Also pub. as USARO-D-TR-14.

Descriptors: *Sampling, *Statistical tests, Standard deviation, Distribution functions, Theorems.
Identifiers: *T test, *Bahadur efficiency.

In the one-sample problem of testing for the location of a symmetric distribution, previous computations of the Bahadur efficiency of the t-test were based on the slope of the t-test under the restricted null hypothesis of normality. The author rectifies this shortcoming by finding the slope of the t-test under the full nonparametric null hypothesis. This is done by solving an extremal problem in large deviations for the t-statistic. It is also shown that the maximum slope in this one-sample problem is attained by a linear signed-rank test.

AD-A012 252/3GA PC$3.75/MF$2.25
North Carolina State Univ Raleigh
On the Laplace Transform for Distributions,
Douglas B. Price. 21 May 73, 33p ARO-10647.14-M
Grant DA-ARO-D-31-124-72-G192
Doctoral thesis.
Availability: Pub. in SIAM Jnl. on Mathematical Analysis, v6 n1 p49-80 Feb 75.

Descriptors: *Laplace transformation, *Functional analysis, Fourier analysis, Sequential analysis, Theorems, Distribution, Reprints.
Identifiers: Schwartz distribution.

A new characterization of the Laplace transform for Schwartz distributions is developed, using sequences of linear transformations on the space of distributions. The standard theorems on analyticity, uniqueness and invertibility of the transform are proved, using the new characterization as the definition of the Laplace transform. It is shown that this sequential definition is equivalent to Schwartz's extension of the ordinary Laplace transform to distributions which he obtained from the Fourier transform. (Author)

AD-A012 285/3GA PC$3.75/MF$2.25
Admiralty Underwater Weapons Establishment Portland (England)
An Introduction to the Discrete Kalman Filter with Some Applications.
Technical note,
H. H. Ashworth. Jan 75, 28p Rept nos. AUWE-TN-518/74, AUWE-Acc-38087 DRIC-BR-47596

Descriptors: *Kalman filtering, Least squares method, Partial differential equations, Matrices(Mathematics), Linear systems, Mathematical models, Great Britain.
Identifiers: Filtering theory.

The essential components of a Kalman filter are defined, and the equations describing the simplest form of filter are derived. Certain features of the equations are highlighted and examples of the use of the equations are given. A connection between the Kalman filter and a least squares approach is indicated. Some practical difficulties in the application of the Kalman filter equations are described, and various methods of overcoming the difficulties are discussed.

AD-A012 379/4GA PC$3.25/MF$2.25
Kappa Systems Inc Paoli Pa
A Probability Bound for the Union of Random Sets.
Technical rept.,
David W. Walkup. Sep 74, 10p Rept no. CS-74-9
Contract N00014-67-A-0445-0003

Descriptors: *Set theory, *Probability, Sequences(Mathematics), Random variables, Reliability, Theorems.
Identifiers: Failure rate functions, Polya theorem.

Given a collection of independent random subsets of a finite set N satisfying certain symmetry conditions, there is an easily-computed estimate for the probability their union is N. It is shown this estimate is a valid upper bound, provided certain functions associated with the distribution of the random size of the subsets have concave logarithms. Examples are given. The results complement known results in the theory of reliability on sums of random variables with increasing failure rates.

AD-A012 380/2GA PC$3.25/MF$2.25
Kappa Systems Inc Paoli Pa
Matchings in Random Regular Bipartite Digraphs.
Technical rept.,
David W. Walkup. Sep 74, 15p Rept no. CS-74-10
Contract N00014-67-A-0445-0003

Descriptors: *Graphics, Probability, Asymptotic series, Inequalities, Theorems.
Identifiers: *Graph theory, *Directed graphs, *Bipartite graphs.

Let G be a random directed bipartite graph with n nodes in each class and outward degree d at each node. The probability G contains a matching is shown to approach one for large n if d > or = 2, but to approach zero if d = 1. This result complements and contrasts with a result of Erdos and Renyi which implies the probability of a matching does to zero if the number of arcs (chosen at random without regard to regularity) grows more slowly than n log n.

AD-A012 381/0GA PC$3.25/MF$2.25
Kappa Systems Inc Paoli Pa
Polya Frequency Sequences and the Exponential Generating Function.
Technical rept.,
David W. Walkup. Aug 74, 12p Rept no. CS-74-8
Contract N00014-67-A-0445-0003

Descriptors: *Exponential functions, *Sequences(Mathematics), Set theory, Matrices(Mathematics), Theorems.
Identifiers: Polya theorem, *Generating functions.

A basic result in the theory of total positivity is that the convolution of any two P(F sub 2) sequences (sequences such that the logarithms of their elements are concave functions of the index) is again a P(F sub 2) sequence. This result, with its obvious interpretation in terms of ordinary generating functions is shown to carry over to binomial convolution and the exponential generating function.

AD-A012 401/6GA PC$3.25/MF$2.25
New York Univ Ny Graduate School of Public Administration

Computational Methods in Single Server Queues with Hyperexponential Arrivals and Service.
Technical rept.,
Irwin Greenberg. 30 Jun 75, 19p Rept no. TR-11
Contract N0014-67-A-0467-0028

Descriptors: *Queueing theory, Probability density functions, Standard deviation, Algorithms, Computations.
Identifiers: Erlang density functions, Single server queue.

A class of submodels to be used in the overall readiness measurement models is the queueing system model. A computational algorithm for single server queues with hyperexponential interarrival and service times is developed and illustrated.

N75-24419/4GA PC$4.25/MF$2.25
TRW Systems Group, Redondo Beach, Calif.
Some Self Starting Integrators for X Prime Equals F (X, T).
W. M. Lear. 27 Nov 74, 73p NASA-CR-141784, MSC-14802
Contract NAS9-14330

Descriptors: *Differential equations, *Digital integrators, *Orbital position estimation, *Runge-kutta method, Accelerometers, Problem solving, Tables (Data), Taylor series.

For abstract, see STAR 1315

N75-24421/0GA PC$3.75/MF$2.25
National Physical Lab., Teddington (England). Div. of Numerical Analysis and Computing.
Methods for Computing and Modifying the Ldv Factors of a Matrix.
P. E. Gill, W. Murray, and M. Saunders, A.. Sep 74, 50p NPL-NAC-56

Descriptors: *Algorithms, *Factorials, *Matrices (Mathematics), *Orthogonality, *Stability, Computation, Linear programming, Partitions (Mathematics), Recursive functions, Scaling laws, Theorem proving.

For abstract, see STAR 1315

N75-24521/7GA PC$7.25/MF$2.25
Technische Universitaet, Munich (West Germany).
The Problem of Integration in the Cybernetic System Theory of Karl Deutsch das Problem der Integration in der Kybernetischen Systemtheorie von Karl Deutsch.
Ph.D. Thesis.
C. Kirschstein. 1974, 206p
Language in German.

Descriptors: *Control theory, *Cybernetics, *Sociology, Communication theory, Culture (Social sciences), Management planning, Philosophy, Politics.

For abstract, see STAR 1315

12B. Operations Research

AD-A011 682/2GA PC$3.25/MF$2.25
Northwestern Univ Evanston Ill Dept of Industrial Engineering and Management Sciences
Reduction and Decomposition of Large Generalized Geometric Programming Problems, with Applications.
Progress rept. 1 Mar 74-28 Feb 75,
E. L. Peterson, and R. A. Abrams. 1975, 11p
AFOSR-TR-75-0806
Grant AF-AFOSR-2516-73
See also report dated 1974, AD-779 929.

Descriptors: *Mathematical programming, Transportation, Pipelines, Chemical equilibrium, Regression analysis, Control theory, Optimization, Mathematical models.
Identifiers: *Geometric programming, Transportation models.

This report is a brief summary of progress by the authors and their associates in their research on the reduction and decomposition of large generalized geometric programming problems and their application for the period 1 March 1974 through 28 February 1975. The problems under study concern (1) the optimal design and operation of hydraulic pipelines, transportation networks, and mechanical and electrical devices, (2) the optimal location of facilities, (3) the analysis and optimal design of structures, and (4) certain aspects of chemical equilibrium, regression analysis, and optimal control. To effectively and efficiently obtain solutions to these problems when stated in geometric programming formulations, methods that ameliorate the complexity of the total system are being developed. These methods center around the ideas of 'decomposing' the total system into smaller subsystems and 'reducing' the dimensionality of the overall system. This summary provides an outline of the most recent results in this research project and provides a listing of publications in which additional detail on the research can be obtained.

AD-A011 747/3GA PC$3.25/MF$2.25
Yale Univ New Haven Conn Cowles Foundation for Research in Economics
Oligopoly Theory, Communication, and Information,
Martin Shubik. 1975, 8p Rept no. Foundation paper-426
Contract N00014-67-A-0097-0011
Availability: Pub. in The American Economic Review, v65 n2 p280-283 1975.

Descriptors: *Game theory, Economics, Mathematical models, Market research, Theory, Equilibrium(General), Information, Reprints.
Identifiers: Oligopoly theory.

The stage is set for the development of a mathematical institutional economics which is simultaneously more abstract and more institutional than much of economic theory to date. The need for this development can be seen clearly by examining both the successes and failures of oligopoly theory. Oligopoly theory has been the skeleton in every economic theorist's closet. Virtually every course in theory has a few hours spent in telling the students about the problems posed and showing them a few classical 'solutions,' after which the subject is dropped. The reason for this treatment is because we do not have a generally accepted adequate theory of oligopoly. The reasons why we do not have a satisfactory theory are central to many economic problems. They exist for microeconomic models of competitive markets and they are hidden in the assumptions made in macroeconomic models. However, it is possible to gloss over the basic difficulties in these because, although they are still there, they do not appear to play as central a role as they do in oligopoly theory. (Author)

AD-A011 840/6GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y Dept of Operations Research
On Edge-Disjoint Branchings.
Technical rept.,
D. R. Fulkerson, and Gary Harding. Jun 75, 13p Rept no. TR-255
Contract N00014-75-C-0622, Grant NSF-MPS74-24026

Descriptors: *Graphics, *Network flows, Theorems.
Identifiers: *Directed graphs, *Graph theory.

Edmonds has given a complicated algorithmic proof of a theorem characterizing directed graphs that contain k edge-disjoint branchings having specified root sets. Tarjan has described a conceptually simple and good algorithm for finding such branchings when they exist. Tarjan's algorithm is based on a lemma implicit in Edmonds' results. A simple direct proof of this lemma is given, thereby providing a simpler proof of Edmonds' theorem and a simpler proof that Tarjan's algorithm works.

AD-A011 844/8GA PC$5.75/MF$2.25
Caci Inc Los Angeles Calif
Optimization Techniques for Computerized Simulation Models.
Technical rept. Nov 74-May 75,
William Farrell, Chester H. McCall, Jr., and Edward C. Russell. Jun 75, 128p Rept no. TR-1200-4-75
Contract N00014-75-C-0270

Descriptors: *Optimization, *Computerized simulation, Mathematical models, Performance, Search theory, Steepest descent method, Algorithms, Effectiveness, Analysis of variance.

This paper reports on the state of the art of available optimization techniques which can be associated with computerized simulation models. Specifically, the paper focuses on findings from a literature search and contacts with professionals involved in current research on those optimization techniques which can be applied to the identification of an optimum value for a single output performance measure when a family of input variables can assume either continuous or discrete values. In addition, the research considers a set of measures of effectiveness which can be used to assess the relative merits of the various optimization techniques encountered without providing a numerical ranking.

AD-A012 100/4GA PC$3.75/MF$2.25
George Washington Univ Washington D C Inst for Management Science and Engineering
Maximum Likelihood Estimation of the Parameters of a Power Rule Model Using the Sequential Unconstrained Minimization Technique (SUMT).
Technical memo. 1 Jan-31 Mar 75,
Faiz A. Al-Khayyal. 31 Mar 75, 26p Rept no. TM-64852 ARL-75-0217

Descriptors: *Nonlinear programming, Statistical analysis, Computer programs, Optimization, Accelerated testing, Life tests.
Identifiers: *Sequential unconstrained minimization technique, Maximum likelihood estimation, Parameter estimation, Factorable programming, SUMT computer program.

In this memorandum the author deals with an application of a modified procedure for SUMT to a maximum likelihood estimation problem which arises in the study by SINGPURWALLA (1975) on accelerated life tests. After a short background to this modification, the author defines what is meant by a factorable programming problem. A simple example of how to rewrite a nonlinear equation into factorable form is given, followed by a detailed restatement of maximizing the likelihood function as a factorable programming problem. The procedure is outlined for using the factorable programming interface with SUMT and illustrate its use is illustrated.

13. MECHANICAL, INDUSTRIAL,

CIVIL, AND MARINE ENGINEERING

13A. Air Conditioning, Heating, Lighting, and Ventilating

AD-A012 152/5GA PC$5.25/MF$2.25
Airesearch Mfg Co of California Torrance
Advanced Heat Exchanger Development for Army Mobile Applications.
Final rept. Mar 74-Apr 75,
Murray Coombs. 20 Jun 75, 108p Rept no. 75-11314 TACOM-TR-12043
Contract DAAE07-74-C-0116

Descriptors: *Military vehicles, *Radiators(General), *Heat exchangers, Heat transfer, Fins, Rotation, Cooling, Cores, Mobile, Computer programs, FORTRAN.
Identifiers: *Rotary heat exchangers, FORTRAN 4 programming language.

The results of an analytical and experimental program for high-performance heavy-duty radiators is presented. Various heat transfer matrices were surveyed and analyzed to select optimum air-side surfaces. From this survey four surfaces were selected and four test cores were fabricated and tested. Performance of test cores yielded 6.7 to 20.5 percent increase in heat transfer performance over conventional radiator designs. An analysis of the rotary heat exchanger also was performed. No distinct advantages for the rotary heat exchanger in this application were revealed.

AD-A012 416/4GA PC$5.25/MF$2.25
Naval Postgraduate School Monterey Calif
Thermoeconomic Analysis of Environmental Vapor Power Systems.
Master's thesis,
Furman Ladow Sheppard, Jr. Jun 75, 105p

Descriptors: *Heat exchangers, Mathematical models, Algorithms, Sea water, Pumps, Optimization, Systems engineering, Performance(Engineering), Cost analysis, Computer programs, Theses.
Identifiers: Heat recovery, *Benefit cost analysis, Cost engineering, Unconstrained minimization, Solar sea power plants.

A method is presented for determining the relationships between the costs and technical performance of environmental vapor power systems in a manner which permits fundamental design specifications to be made optimally with respect to overall system lifetime costs. Means of applying optimization techniques for large scale systems to the thermoeconomic analysis of environmental vapor power systems are described and demonstrated with a simplified sample model. A sequential unconstrained minimization algorithm is employed for overall system design optimization.

N75-23667/9GA PC$5.75/MF$2.25
McDonnell-Douglas Astronautics Co., Huntington Beach, Calif.
Evaluation of Dispersion Strengthened Nickel-Base Alloy Heat Shields for Space Shuttle Application.
Summary Report, 15 May 1973 - 31 May 1975.
R. Johnson, Jr., and D. H. Killpatrick. May 75, 126p NASA-CR-132615, MDC-G5241
Contract NAS1-11654

Descriptors: *Heat shielding, *Nickel alloys, *Space shuttles, Design analysis, Flight simulation, Space environment simulation, Thermal simulation.

For abstract, see STAR 1315

N75-23882/4GA PC$4.75/MF$2.25
B & K Engineering, Inc., Towson, Md.
Erts-C (Landsat 3) Cryogenic Heat Pipe Experiment Definition.
Final Report.
P. J. Brennan, and E. J. Kroliczek. Mar 75, 87p NASA-CR-143797, BK005-1009
Contract NAS5-20968

Descriptors: *Cryogenic equipment, *Heat pipes, *Landsat c, Experimental design, Flight characteristics, Heat radiators, Performance tests, Structural design criteria.

For abstract, see STAR 1315

N75-23889/9GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Heat Recovery Systems for Industrial Furnaces, Particularly Coke Ovens.
J. H. F. Cassan. Jun 75, 14p NASA-TT-F-16400
Contract NASW-2481
Tran-Transl. Into English from German Patent No. 900930, Class 10A, Group 401 (Appl. No. C3869v1b/10A, 4 Jan. 1954) 7 p.

Descriptors: *Combustion chambers, *Furnaces, *Heat radiators, *Ovens, Ducts, Exhaust systems, Performance prediction.

For abstract, see STAR 1315

N75-24107/5GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
The Development of a Solar Residential Heating and Cooling System.
4 Apr 75, 53p NASA-CR-142728, M-TU-75-3

Descriptors: *Cooling systems, *Residential areas, *Solar heating, *Systems engineering, Energy storage, Equipment specifications, Flat plates, Performance tests, Product development, Solar collectors, Thermal energy.

For abstract, see STAR 1315

PB-242 155/0GA PC$5.75/MF$2.25
DSS Engineers, Inc., Ft. Lauderdale, Fla.
Development of Plastic Heat Exchangers for Sea Solar Power Plants.
Final rept. 10 Jun 74-28 Feb 75,
W. B. Suratt, G. K. Hart, and E. N. Sieder. 10 Mar 75, 150p NSF/RA/N-75-026
Grant NSF-AER74-13030-A01
Continuation of Grant No. NSF-GI-43444.

Descriptors: *Solar sea power plants, *Heat exchangers, Electric power plants, Offshore structures, Plastics, Design, Cost estimates, Hydraulics, Thermal analysis, Evaporators, Condensers(Liquefiers), Ammonia, Propane, Polyethylene, Filled thermoplastics, Barrier coatings.

Conceptual designs of heat exchangers for the sea solar power plant using lost cost plastic surfaces are evaluated. Composite walls of conductive, filled high density polyethylene and multilayered thin films of impermeable plastics are used as the reference material. Plate surfaces using thin falling films for evaporation and condensation of ammonia are identified as the least expensive concept. Horizontal tubular units are considered but cost and complexity are greater. Cost of heat exchangers for a 240 MW (gross) ammonia plant is estimated at $47/kw which includes replacement of plastic surface twice during a 30 year plant life. Largest cost component is steel work at 56% for the plate unit and 66% for the tubular unit. Average overall heat transfer coefficients of 300 Btu/hr. (ft squared) F (clean) are feasible for ammonia heat exchangers. Prospects for successful development appear to be good. Technical aspects needing further refinement include: thermal conductivities of filled plastics; working fluid film coefficients and pressure drops; long term creep and environmental stress cracking resistance of filled plastic composites.

PB-242 196/4GA PC$3.75/MF$2.25
Allied Chemical Corp., Buffalo, N.Y. Specialty Chemicals Div.
Development of New Working Fluids for Solar Rankine Heat Pumps.
Annual progress rept. 1 May-31 Dec 74,
R. A. Allen, and L. I. Stiel. 31 Jan 75, 29p
NSF/RANN/SE/GI42506/PR/74-4 NSF/RA/N-75-023
Grant NSF-GI-42506

Descriptors: *Halohydrocarbons, *Heat pumps, *Fluids, Thermodynamic properties, Rankine cycle, Heat transfer, Solar air conditioners, Solar air conditioning, Solar air heaters, Solar space heating.
Identifiers: *Working fluids.

The effect of the thermodynamic properties of working fluids on the performance of a solar powered heat pump has been analyzed. Cycle and overall efficiencies have been calculated for approximately 35 halocarbons and other substances. The fluids are classified by boiling points and results are tabulated for operation both in cooling and heating modes. Plots are also presented indicating the variation of efficiencies with the maximum temperature, degree of regeneration, and condenser and evaporator temperatures. Of the fluids considered, R-11, R-113, R-132b, R-142, R113/152 and toluene have the highest overall efficiencies for a single fluid system operating at an upper temperature of 180F.

PB-242 431/5GA PC$3.75/MF$2.25
Western Forest Products Lab., Vancouver (British Columbia).
Operation and Maintenance of Pneumatic Recorder-Controllers for Dry Kilns.
Information rept.,
S. McIntyre. Apr 75, 46p VP-X-92-Rev

Descriptors: *Pneumatic controllers, *Recording instruments, *Kilns, Pneumatic equipment, Canada, Temperature control, Humidity control, Calibrating.

Almost all recorder-controllers for dry kiln temperature and humidity in Canada are of the vapor-pressure (volatile liquid) type. This report describes their construction, operation, maintenance and calibration. Sections are included on trouble-shooting, and the prevention of the more common problems associated with them.

PB-242 773/0GA PC$8.50/MF$2.25
American Physical Society, Washington, D.C.
Efficient Use of Energy: A Physics Perspective, A Report of the Research Opportunities Group of a Summer Study Held in Princeton, New Jersey on July, 1974,
Walter Carnahan, Kenneth W. Ford, Andrea Prosperetti, Gene I. Rochlin, and Arthur H. Rosenfeld. Jan 75, 264p
Prepared in cooperation with National Science Foundation, Washington, D.C., Federal Energy Administration, Washington, D.C., and Electric Power Research Inst., Palo Alto, Calif.

Descriptors: *Energy conservation, *Meetings, Thermal efficiency, Thermodynamic properties, Houses, Automobiles, Industrial plant efficiencies, Industries, Residential buildings, Insulation, Air conditioning, Space heating, Hot water heating, Illuminating, Temperature control, Motor vehicle drive systems, Automobile tires, Electric power generation.

Research opportunities in physics related to efficient energy utilization are identified. Stress is given to the conceptual framework of ther-

modynamics, especially as a tool for assessing the efficiency of the management of low quality heat. Elementary quantitative models of energy flows in the house and the car are developed. The report emphasizes the importance of new systems concepts and new materials for the management of heat and of new diagnostic instrumentation. Further technologies reviewed include the automobile tire and suspension, hot water heaters, HVAC systems, the fuel cell as a combined system for electricity and heat, electrochemical processes, and processes involving separative work.

13B. Civil Engineering

AD-A011 811/7GA PC$3.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Snow Road Construction by Layered Compaction-Construction and Maintenance Guide.
Rept. for Jul 66-Jan 73,
J. L. Barthelemy. Apr 75, 24p Rept no. CEL-TR-819

Descriptors: *Roads, Snow, Construction, Compacting, Snow vehicles, Road building equipment, Maintenance, Cold weather, Polar regions.
Identifiers: *Snow roads.

The use of rubber-tired vehicles in polar regions greatly speeds the movement of cargo and personnel. However, in areas of perennial snow, roads must be provided. Heavy-haul, wheeled transportation equipment, in particular, requires high-strength snow roads while operating on deep snow fields. Specially processed, elevated snow roads can provide dependable service for 2 years or more. This construction guide outlines those procedures necessary to build and preserve snow roads by means of layered compaction, the simplest and most rapid technique developed by CEL. In this process, the roadbed is built up to a desired elevation by successive compaction of 4-inch layers of snow. A modified rotary snowplow is used to gather, process and deposit the construction material.

AD-A011 855/4GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Preliminary Studies of Asbestiform Fibers in Domestic Water Supplies.
Final rept.,
Robert C. Cooper, and Jack C. Murchio. Dec 74, 14p Rept no. AMRL-TR-74-125-Paper-5
Prepared in cooperation with California Univ., Berkeley.

Descriptors: *Water supplies, *Asbestos, *Drinking water, *Public health, Fibers, Carcinogens, Wastes(Industrial), Water pollution, California, United States, Ground water, Lakes.
Identifiers: Potable water, *Water pollution effects(Humans), Water analysis.

The authors report upon the results obtained in the analysis of numerous drinking water sources for asbestiform fibers in the United States, with emphasis on Northern California. A technique for asbestos analysis has been developed which seems to compare favorably with the results of others who are using a similar methodology. The development of an acceptable standard method of analysis is essential to the conduct of a rational epidemiological assessment of the impact of asbestiform fibers in drinking water supplies upon human health.

AD-A011 856/2GA PC$3.25/MF$2.25
Aerospace Medical Research Lab Wright-Patterson AFB Ohio
Water Reuse in the United States.
Final rept.,
Benjamin H. Pringle. Dec 74, 17p Rept no. AMRL-TR-125-Paper-6
Prepared in cooperation with Environmental Protection Agency, Washington, D.C.

Descriptors: *Water reclamation, Public health, Drinking water, Water pollution, United States, Toxicology, Carcinogens, Pathology, Hazards, Water treatment, Bacteria, Viruses, Microorganisms.
Identifiers: *Water reuse, *Waste water reuse, *Water pollution effects(Humans).

The report presents background information on water reuse. The pertinent aspects of water reuse are listed as well as the Environmental Protection Agency's policy statement. The problems of viruses and bacteria in water systems are discussed. Also discussed are chemicals that cannot be easily removed which may adversely affect humans. Recommendations are made for public health protection in the use of treated water.

AD-A011 938/8GA PC$6.25/MF$2.25
Houston Research Inc Tex
System for Total Direct Recycle of Secondary Municipal Wastewater. Volume I. Design Concepts.
Final rept. 15 May 73-1 Dec 74,
Charles E. Mauk, Satish L. Gandhi, and Robert W. Legan. Jun 75, 157p AFWL-TR-74-235-Vol-1
Contract F29601-73-C-0094

Descriptors: *Sewage treatment, *Drinking water, *Urban areas, *Water reclamation, Recirculation, Waste water, Closed loop systems, Water quality, Mathematical models, Performance(Engineering), Activated carbon, Ion exchange, Osmosis, Ozone, Computer programming, Evaporation, Chlorination, Ammonia, Costs.
Identifiers: Design, *Waste water reuse, Potable water, Recirculated water, Water reuse, Tertiary sewage treatment.

A study was performed leading to the design of a system to treat municipal secondary effluent to potable quality and allow closed-loop water utilization. A comprehensive literature survey resulted in the acquisition of other 800 papers and reports on all advanced wastewater treatment processes. Summary evaluations were prepared for the important processes. A definition of a set of potable water quality criteria parameters was developed for the specific case of closed-loop water reuse. Mathematical models for performance and costs were compiled for the individual processes. A computer program in Fortran was assembled incorporating the cost and performance models of the processes as subroutines. The resulting computer program represents a mathematical model of the conceptual system and can be used to perform design calculations of optional combinations of the processes.

AD-A011 991/7GA PC$5.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Report of Interagency Conference of Coordination of Research Activities (8th) Held at Army Engineer Waterways Experiment Station, Vicksburg, Miss. on 13-15 November, 1973.
Nov 73, 103p

Descriptors: *Civil engineering, *Soil mechanics, *Rock mechanics, *Meetings, Hydraulic models, Construction, Construction materials, Concrete, Earthquake resistant structures, Electric power transmission, Water quality, Water resources, Finite element analysis, Waste management.
Identifiers: *Earthquake engineering.

This publication summarizes the proceedings of the Eighth Interagency Research Coordination Conference held at the U. S. Army Engineer Waterways Experiment Station (WES), 13-15 November 1973. Conference agenda and session reports include the following: General agenda and schedule of technical sessions; Report of executive session; Agenda and report of hydraulics session; Agenda and report of soil mechanics session; Agenda and report of rock mechanics session; Agenda and report of earthquake engineering session; Agenda and report of concrete and structural technology session; Agenda and report of power session; Agenda and report of finite element analyses session; Agenda and report of shotcreting session; Special reports--Coordination of water quality research; Recreational waste management.

AD-A012 005/5GA PC$8.75/MF$2.25
Cold Regions Research and Engineering lab Hanover N H
Influence of Ice Upon Construction, and Methods of Combatting Ice Problems (Vozdeistvie L'da na Sooruzhenila i Metody Borvie s Ledovymi Zatrudneniiami),
K. N. Korzhavin. Oct 74, 281p Rept no. CRREL-TL-422
Draft trans. of Trudy Koordinatsionnykh Soveshchanii po Gidrotekhnike (USSR) n17 p1-272 1965.

Descriptors: *Construction, *Ice formation, Cold regions, Arctic regions, Ice, Pressure, Translations, USSR.
Identifiers: *Cold weather construction, *Hydraulic structures.

This collection of articles deals with the variety of ice related factors which influences the specifications for building in an arctic environment. Based on the studies done concerning the effect of ice on completed structures, these articles present logical approaches to estimating effective ice loads and how to determine the necessary ice protective measures while building reservoirs, hydraulic structures, harbor ships, etc. Several articles concern how to weaken ice strength or increase the rate of thawing.

AD-A012 066/7GA PC$5.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Rock Core Tests, Proposed Duplicate Lock-Phase II, Starved Rock Lock and Dam, Illinois River, Illinois.
Final rept.,
Richard L. Stowe, and James Warriner. Jun 75, 114p Rept no. AEWES-Misc-Paper-C-75-9

Descriptors: *Dams, *Foundations(Structures), *Core sampling, Rock, Rock drilling, Geological survey, Stratigraphy, Petrography, Illinois.
Identifiers: *Foundation engineering, Illinois River, Starved Rock Dam, *Locks(Waterways), Design criteria, LaSalle County(Illinois).

A rock core testing program was conducted for the U.S. Army Engineer District, Chicago, as part of a continuing foundation investigative program. After reviewing available reports and current drilling activity, a testing program was recommended and subsequently carried out. A sufficient number of laboratory tests were conducted on representative bedrock samples and an analysis of these tests was made. Limited field work was conducted in order to obtain information about orientations of discontinuities. Laboratory tests consisted of index property tests (including unit weights, specific gravity of solids, moisture content, porosity, and compressional wave velocity), unconfined compression, triaxial, tensile, and direct shear tests. Direct shear tests were conducted on intact core, precut surfaces, natural joints, and on thin shale beds contained in dolomite. A petrographic examination was conducted on selected samples to ascertain nomenclature and mineral content.

AD-A012 067/5GA PC$8.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Background Theory and Documentation of Five University of Texas Soil-Structure Interaction Computer Programs.
Final rept.,
N. Radhakrishnan, and Frazier Parker, Jr. May 75, 293p Rept no. AEWES-Misc-Paper-K-75-2

Descriptors: *Pile structures, *Soil mechanics, Interactions, Finite difference theory, Foundations(Structures), Loads(Forces), Computer programs, User needs, Soil resistant properties, FORTRAN.
Identifiers: *Soil structure interations, COM62 computer program, PX4C3 computer program, MAKE computer program, BENT1 computer program, BMCOL51 computer program, G-635 computers.

The primary purpose of this report is to document four pile analysis-related finite difference computer programs (COM62, PX4C3, MAKE, and BENT1) and a structural analysis program (BMCOL51). These programs have been converted to run on the U.S. Army Engineer Waterways Experiment Station (WES) G-635 computer system. Basic theory to explain the methods used in the computer programs is also included in the report. COM62 solves laterally loaded pile problems using an iterative scheme that considers nonlinear soil resistance versus pile movement curves. PX4C3 is a computer program written for the analysis of an axially loaded pile accounting for nonlinear soil properties. MAKE is a program that generates lateral soil resistance-pile movement curves from laboratory soil testing data based on predefined criteria. BENT1 analyzes group pile problems, again accounting for nonlinear soil behavior under both axial and lateral loads. BMCOL51 is a computer program based on the discrete element theory.

AD-A012 069/1GA PC$3.25/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Scale Effects in Rubble-Mound Breakwater Stability Models Caused by Variations in the Specific Gravity of the Armor Units and Underlayer Stones.
Final rept.,
Robert Y. Hudson. May 75, 21p Rept no. AEWES-Misc-Paper-H-75-4

Descriptors: *Breakwaters, *Hydraulic models, Rock, Specific gravity, Scaling factors, Stability.
Identifiers: *Rubble mound breakwaters.

The analytical bases for obtaining dynamic similarity between model and prototype for rubble-mound stability studies were reviewed, and the results of available small-scale tests were analyzed to determine whether variations in the specific gravity of the armor units in the model, compared with the corresponding specific gravity of the prototype units, resulted in undesirable scale effects. It was concluded that: (a) considering the Kydland and Sodefjed data, the stability number, as defined in this report, varies with the specific gravity of the armor units relative to the water in which the structure is situated, (b) considering the Waterways Experiment Station data and the relatively small variations in the specific gravities of the armor units, model to prototype, that have occurred in the model studies conducted to determine the design of the proposed Public Service Electric and Gas Company of New Jersey breakwaters, the scale effects due to the specific gravity ratio are negligible.

AD-A012 083/2GA PC$6.25/MF$2.25
Tundra Biome Analysis of Ecosystems College Alaska
Tundra Biome Research in Alaska - The Structure and Function of Cold-Dominated Ecosystems,
Jerry Brown, and George C. West. Nov 70, 157p Rept no. 70-1

Descriptors: *Tundra, *Ecology, *Oil pollution, Oil spills, Coastal regions, Micrometeorology, Soils, Photosynthesis, Biological food chains, Atmospheric temperature, Environmental protection, Microbiology, Tables(Data), Plant growth, Water quality, Cold regions, Water chemistry, Alaska.
Identifiers: *Ecosystems, Prudhoe Bay, *Primary biological productivity, Barrow(Alaska), Tundra Biome program, Water quality data, Taiga.

The objective of the Tundra Biome Program is to acquire a basic understanding of tundra, both alpine and arctic, and taiga. Collectively these are referred to as the cold-dominated ecosystems. The program's broad objectives are threefold: To develop a predictive understanding of how the wet arctic tundra ecosystem operates, particularly as exemplified in the Barrow, Alaska, area; to obtain the necessary data base from the variety of cold-dominated ecosystem types represented in the United States, so that their behavior can be modeled and simulated, and the results compared with similar studies underway in other circumpolar countries; to bring basic environmental knowledge to bear on problems of degradation, maintenance, and restoration of the temperature-sensitive and cold-dominated tundra/taiga ecosystems.

AD-A012 109/5GA PC$3.75/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
Environmental Protection Guidelines for the Resident Engineer.
Final rept.,
Robert E. Riggins. May 75, 43p Rept no. CERL-TR-E-57

Descriptors: *Construction, *Pollution, *Contract administration, Abatement, Air pollution, Water pollution, Waste disposal, Land use, Sites, Erosion, Monitoring, Vegetation.
Identifiers: Guideline development, Air pollution control, Water pollution control, Esthetics, Solid waste disposal, Environmental quality.

This report presents guidelines to assist resident engineers in monitoring compliance with the environmental provisions of construction contracts. It describes general environmental responsibilities of the resident engineer; sources of environmental pollution; techniques for providing environmental protection; and methods of evaluating a construction site for potential environmental problems.

AD-A012 147/5GA PC$7.50/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Los Angeles and Long Beach Harbors Model Study. Report 1. Prototype Data Acquisition and Observations.
Technical rept.,
Ellis B. Pickett, Donald L. Durham, and William H. McAnally. Jun 75, 243p Rept no. AEWES-TR-H-75-4-1
See also Report no. 2 dated Jan 75, AD-A005 149.

Descriptors: *Harbors, *Mooring, *Hydraulic models, Ship motion, Merchant vessels, Tidal currents, Water waves, California, Data acquisition.
Identifiers: Long Beach harbor, Los Angeles harbor.

This report describes the instrumentation, operation, calibration, and collected data of a 1-yr prototype wave, tide, and ship movement data acquisition program conducted by the U.S. Army Engineer Waterways Experiment Station and is the first of a series to be published under the general title 'Los Angeles and Long Beach Harbors Model Study.' This model study has four major objectives: (1) to determine incidence and severity of troublesome oscillations in the present harbor complex, (2) to investigate tidal circulation characteristics of the present and proposed harbors, (3) to determine the optimum plan for future expansions to provide safe and economical berthing areas, and (4) to analyze the effect proposed expansions will have on existing harbors. The first two objectives require very accurate and reliable prototype data.

AD-A012 175/6GA PC$3.25/MF$2.25
Army Mobility Equipment Research and Development Center Fort Belvoir Va
A Present Value-Unit Cost Methodology for Evaluating Wastewater Reclamation and Direct Reuse at a Military Base of Operations.
Technical rept. Jun 73-May 74,
Vincent J. Ciccone. Dec 74, 19p Rept no. USAMERDC-2123
See also report dated 1971, AD-746 621.

Descriptors: *Water reclamation, *Waste water, *Military requirements, Water supplies, Costs, Water quality, Drinking water, Feasibility studies, Economics, Mathematical models, FORTRAN, Policies, Predictions, Computer programming.
Identifiers: *Waste water reuse, Potable water, Water demand, Water costs.

The present value method of economic evaluation is applied to a water supply problem typical for a military operation. A relevant unit cost figure, called the 'present value-unit cost' (PVUC), is determined and applied to alternative methods for meeting a projected need for water. The concepts of reclamation and dual supply systems are introduced and presented as feasible alternatives. A hierarchy of water use is established, with the highest quality intended for potable purposes. A lesser quality is provided for non-potable uses. A mathematical model is formulated and coded in FORTRAN for use on a digital computer. The model incorporates the ideas of a dual supply system by the reclamation of treated wastewaters and the direct reuse of these waters after specified advance treatment. The technique used for economic evaluation is the present-value method, by which a direct comparison between alternatives may be made. The model presented focuses on the relationship of a demand for water and alternative methods to satisfy that requirement.

AD-A012 206/9GA PC$3.25/MF$2.25
Edgewood Arsenal Aberdeen Proving Ground Md
Effects of Discharge from a Dredge Spoils Site on Carroll Island, Maryland.
Technical rept. Apr 72-Jan 74,
J. Gareth Pearson, and Edward S. Bender. Jun 75, 19p Rept no. EB-TR-75030

Descriptors: *Invertebrates, *Solid wastes, *Earth fills, *Water pollution, Sampling, Drainage, Shellfish, Maryland, Shores, Chesapeake Bay, Storms, Abundance, Silt, Estuaries, Brackish water, Fresh water.
Identifiers: *Dredge spoil, *Carroll Island, Dredging, Spoil, *Water pollution effects(Animals), Hurricane Agnes, Rangia cuneata, Leptocheirus plumulosus, Scolecolepides viridis.

Benthic sampling of macroinvertebrate populations was conducted 14 times from April to August 1972 to determine the effects of a discharge from a dredge spoils site on Carroll Island, MD, on the upper western shore of the Chesapeake Bay. During the sampling period,

8.78 inches of rain fell on the study area from 21 to 23 June 1972 during tropical storm Agnes. Nine samples were collected prior to Agnes and five were taken after the storm. Twenty-two species (20 invertebrates and 2 vertebrates) were collected; 81.5% of the sample was represented by three species: The brackish-water clam, Rangia cuneata; the amphipod, Leptocheirus plumulosus; and the polychaete, Scolecolepides viridis. The number of small R. cuneata (1.3 to 4.3 mm) increased significantly after the storm, indicating that there was an influx of juvenile clams. Despite the extreme temporary hydrologic occurrences caused by the tropical storm, most changes in the number of individuals and species could be attributed to the effects of the dredge spoils discharge on Station 3 and seasonal changes in the species abundance during the study period.

AD-A012 210/1GA PC$5.25/MF$2.25
New Mexico Univ Albuquerque Eric H Wang Civil Engineering Research Facility
Applicability of Acoustic-Emission Techniques to Civil Engineering Research.
Final rept. 21 Jan-30 Jun 74,
Larry W. Bickle, and Adalbert J. Smiel. Jun 75, 102p AFWL-TR-74-299
Contract F29601-74-C-0030

Descriptors: *Acoustic emissions, *Fracture(Mechanics), *Plastic deformation, *Ultrasonic tests, *Reinforced concrete, Leak detectors, Test equipment, Pavements, Transducers, Pressure gages, Fatigue(Mechanics), Defects(Materials), Tensile properties, Stress corrosion, Pressure vessels.
Identifiers: Flexible pavements, Plumbing, Microcracks.

When a solid undergoes a plastic deformation or fracture, part of the stored strain energy is released as elastic stress waves which can be sensed by sophisticated instrumentation. These stress waves are termed acoustic emissions even though the amplitudes and frequencies involved are usually outside the audible range. This study demonstrated that acoustic emission technology is becoming increasingly more suitable for field applications in civil engineering. Further research relating to reinforced concrete, soils, paving materials, and passive transducers is clearly justified.

AD-A012 280/4GA PC$5.75/MF$2.25
Utah State Univ Logan Dept of Civil and Environmental Engineering
Structuring Communications Programs for Public Participation in Water Resources Planning.
Final rept.,
A. Bruce Bishop. May 75, 143p IWR-CR-75-2
Contract DACW73-72-C-0069

Descriptors: *Water resources, *Public relations, Management, Environmental protection, Models, Civil engineering, Army planning, Decision making, Federal budgets, Communications networks, Water quality.
Identifiers: *Citizen participation, *Public participation, Environmental impacts, Communications programs, Local government, National government, State government, *Participative management.

Most federal agencies with resource planning and management responsibilities have received both executive and legislative directives to promote broad public involvement in their planning studies. This report is directed toward describing methods and techniques for planner-citizen communication which will enhance the level of public participation in the planning process and will permit citizens and planners to work effectively together in arriving at planning decisions which affect multiple local, state, and federal jurisdictions. The report describes the Corps of Engineers' planning process and defines the information generated during the planning activities. The planning process is related to various communication models and an approach to development of public participation programs is suggested. Various techniques and methods for communication with the public are presented. The report concludes with several examples of public participation programs and the relation of these programs to environmental impact assessment and water quality management.

AD-A012 347/1GA PC$3.75/MF$2.25
Geological Survey Tallahassee Fla Water Resources Div
Distribution of Nitrogen and Phosphorus in the Conservation Areas in South Florida from July 1972 to June 1973.
Water-resources investigations (Final),
Bradley G. Waller. May 75, 34p Rept nos. USGS/WRD-75-035, USGS/WRI-5-75
Prepared in cooperation with Corps of Engineers, Washington, D.C.

Descriptors: *Water quality, *Runoff, *Nitrates, *Phosphates, Atmospheric precipitation, Surface waters, Recreation, Storage, Water flow, Drainage, Streams, Distribution, Conservation.
Identifiers: *Florida, *Everglades National Park, Water quality data, Water storage.

From July 1972 to June 1973, 78% (5,200 metric tons or 5,700 tons) of the total nitrogen and 90% (207 metric tons or 228 tons) of the total phosphorus entering the conservation areas was contributed by bulk precipitation (rainfall and dry fallout). Controlled and noncontrolled surface-water discharge contributed the remainder: 22% (1,460 metric tons or 1,610 tons) of total nitrogen and 10% (22.4 metric tons or 24.7 tons) of total phosphorus. Most surface-water loads, 90% of the total nitrogen (696 metric tons or 767 tons) and 88% of the total phosphorus (5.2 metric tons or 5.7 tons) leaving the conservation areas entered Everglades National Park. About 5,000 metric tons (5,500 tons) of total nitrogen and nearly 220 metric tons (242 tons) of total phosphorus were apparently retained within the conservation areas.

COM-75-10769/8GA PC$4.25/MF$2.25
National Bureau of Standards, Washington, D.C. Inst. for Applied Technology.
Review of Standards and Other Information on Thermoplastic Piping in Residential Plumbing.
Building Science series rept. Jan 72-Jun 74,
Robert S. Wyly, William J. Parker, Daniel E. Rorrer, James R. Shaver, and Grover C. Sherlin. May 75, 68p* NBS-BSS-68
Sponsored in part by Department of Housing and Urban Development, Washington, D.C. Policy Development and Research. Library of Congress Catalog Card no. 75-619100. Supersedes rept. no. NBSIR-74-531. Paper copy also available from GPO as C13.29:2/68.

Descriptors: *Plastic pipes, *Plumbing, *Standards, Thermoplastic resins, Residential buildings, Fire resistance, Performance, Physical properties.

The paper is a review of existing information on the physical characteristics of thermoplastic piping that are of particular interest in considering its potential for use in residential, above-ground plumbing. The presentation is oriented to considerations of adequacy of functional performance of plumbing systems from the user's/owner's viewpoint in contrast with the typical product-specifications oriented format reflected in current standards. Not only are the physical characteristics emphasized that relate most directly to the determination of functional performance of installed systems, but the importance of design and installation detail in the context is discussed. In conclusion, this review indicates the need for better use of existing knowledge as well as for some research and test development work particularly in the areas of thermal properties, response to building fires, and resistance to water hammer.

COM-75-10851/4GA PC$4.75/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Marine Ecosystems Analysis Program Office.
Assessment of Offshore Dumping; Technical Background: Physical Oceanography, Geological Oceanography, Chemical Oceanography.
Technical memo.,
Robert L. Charnell. Apr 75, 93p NOAA-TM-ERL-MESA-1 NOAA-75052302

Descriptors: *Oceanographic data, *Waste disposal, *New York Bight, Ocean currents, Sewage disposal, Ocean bottom topography, Circulation, Sludge disposal, Water flow, Sediment transport, Sedimentation, Chemical properties, Marine geology, Nutrients, Water quality, Suspended sediments, Water chemistry, Meteorological satellites.
Identifiers: *Ocean waste disposal, Ecosystems, ERTS-1 satellite, Water quality data, MESA(Marine Ecosystems Analysis), Marine ecosystems analysis.

The report examines physical, geographical, and chemical oceanographic features of the New York Bight and their relationship to waste and sewage disposal in the area. The investigation includes studies of ocean currents, sea floor topography, sedimentation, methods of sewage disposal, and the chemical composition of sewage. Data from sampling in the area are presented.

COM-75-10913/2GA PC$4.25/MF$2.25
National Oceanic and Atmospheric Administration, Boulder, Colo. Marine Ecosystems Analysis Program Office.
Suspended Particulate Matter in the New York Bight Apex: September-November 1973.
Technical rept.,
David E. Drake. Nov 74, 59p NOAA-TR-ERL-318, MESA-1 NOAA-75060501
Paper copy also available from GPO as C55.13:ERL 318-MESA 1.

Descriptors: *Suspended sediments, *Ocean currents, *Water pollution, *New York Bight, Surveys, Particles, Spoil, Sediment transport, Dispersing, Ocean environments, Stream flow, Spatial distribution.

The distribution of suspended particulate matter in the New York Bight apex was studied during the fall of 1973. Five surveys from September through November revealed consistent suspended matter distributions that reflect the bight apex water circulation. Two major currents dominate during the fall season of limited river flow and gradually weakening water column stratification: (1) Relatively fresh surface water, containing between 1 and 4 mg/l of suspended particles, flows from Hudson estuary and down the New Jersey coast within 5 to 10 km from shore; and (2) northward flow along Hudson shelf channel occurred during all surveys. Total suspended matter distributions and dispersion patterns of iron particles dumped at the acid-waste dumpsite support the existence of a clockwise gyre in the central portion of the area during the fall season; the shelf-channel current forms the western limb of this gyre. Contaminated sediments are widely dispersed in the bight apex water column. However, major dispersion appears to be centered on the Hudson shelf channel with good evidence that material dumped at the valley head is transported both up and down the channel that material dumped at the valley head is transported both up and down the channel in substantial quantities.

COM-75-50349/0GA Not available NTIS
National Bureau of Standards, Washington, D.C.
The Numbers Game in Stacks and Drains.
Final rept.,
M. J. Orloski. 1975, 15p
Pub. in Proceedings of Annual Meeting of the American Society of Sanitary Engineering (68th), New Orleans, La., 13-16 Oct 74, ASSE Yearbook, v52 p122-135 1975.

Descriptors: *Plumbing, Standards, Hydraulics.
Identifiers: Reprints.

The paper discusses some of the historical aspects of plumbing research and plumbing code committee work (Part I). Fundamentals of hydraulics are reviewed as they relate to the intent of plumbing codes (Part II), and current NBS programs on the evaluation of plumbing systems in the laboratory and in the field are discussed (Part III). Considerations involved in implementing the performance approach are covered briefly.

COM-75-90008-05-01/GA
(Order as COM-75-90008-05)
Corps of Engineers, Baltimore, Md.
Model for a Study of Chesapeake Bay,
Alfred E. Robinson, Jr., and James H. McKay.
May 75, 8p NOAA-75052005-1
Included in Mariners Weather Log, v19 n3, May 75. Also pub. in Water Spectrum, v5 n2, 1973.

Descriptors: *Chesapeake Bay, *Hydraulic models, *Estuaries, Ocean currents, Tides, Recreation, Fisheries, Seafood, Fresh water, Shellfish, Water transportation, Algae, Pollution, Susquehanna River.

The current systems, tides, and water quality of Chesapeake Bay are complex and highly variable over time and space. When the works of man are superimposed on a regimen, it is evident that planning and study are needed to conserve the resources of such an estuarine system. The report studies and explains the need for construction of a model of the Chesapeake Bay. This hydraulic model, used in conjunction with analytical and field studies, should assist water resource planners in realizing the most beneficial uses of the Chesapeake Bay and its resources.

NTIS/PS-75/582/7GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Wastewater Treatment Using Flocculation, Coagulation, and Flotation (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Edward J. Lehmann. Jul 75, 145p*

Descriptors: *Sewage treatment, *Bibliographies, *Industrial waste treatment, *Flocculating, *Coagulation, *Flotation, Biochemical oxygen demand, Precipitation(Chemistry), Anaerobic processes, Flocculants, Turbidity, Thiols, Water pollution, Sludge disposal.
Identifiers: Biological industrial waste treatment, Wine industry, Tertiary sewage treatment.

Flocculation, coagulation, and flotation studies for sewage and industrial waste treatment processes are presented in this bibliography of Federally funded research. The processes, flocculants, coagulants, performance and effectiveness are covered. (Contains 140 abstracts)

NTIS/PS-75/583/5GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Sewage Filtration (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Edward J. Lehmann. Jul 75, 118p*

Descriptors: *Sewage filtration, *Bibliographies, Municipalities, Trickling filters, Water pollution control, Nitrification, Biochemical oxygen demand, Mathematical models, Pilot plants, Coal, Suspended sediments, Activated carbon treatment, Sand filtration, Dewatering, Vacuum, Strainers.
Identifiers: Brewing industry, Biological industrial waste treatment, Poultry processing, Tanneries.

All aspects of municipal sewage filtration are presented in this bibliography of Federally-funded research. This includes trickling filters, sand filters, microstrainers, vacuum filters and other types except membrane filters. (Contains 113 abstracts)

NTIS/PS-75/585/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Phosphorus Removal in Sewage Treatment Systems (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Edward J. Lehmann. Jul 75, 136p*
See also NTIS/PS-75/586.

Descriptors: *Sewage treatment, *Bibliographies, *Phosphorus, *Chemical removal(Sewage treatment), Precipitation(Chemistry), Bioassay, Water pollution control, Microbiology, Phosphorus cycle, Inorganic phosphates, Aeration, Industrial waste treatment, Food processing, Nutrients, Oxygen.
Identifiers: Eutrophication, Tertiary sewage treatment, Sewage irrigation.

These abstracts of Federally-funded research reports cover the removal of phosphorus in sewage treatment systems. Included are studies on precipitation, sewage microbiology, tertiary sewage techniques, system designs, oxygenation, and combined industrial-sewage processes. (Contains 131 abstracts)

NTIS/PS-75/586/8GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Nitrogen Removal in Sewage Treatment Systems (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Edward J. Lehmann. Jul 75, 118p*
See also NTIS/PS-75/585.

Descriptors: *Sewage treatment, *Bibliographies, *Nitrogen, Chlorination, Denitration, Nitrification, Microbiology, Nitrogen cycle, Ammonia, Inorganic nitrates, Automatic control, Design, Patents, Chemical removal(Sewage treatment), Industrial waste treatment, Water pollution control.
Identifiers: Tertiary sewage treatment.

All aspects of the removal of nitrogen compounds in sewage treatment systems is covered in these abstracts of Federally-funded reports. Included are studies on breakpoint chlorination, denitration, nitrification, microbiology, tertiary sewage treatment, ammonia stripping, and process design. (Contain 113 abstracts)

N75-23688/5GA PC$7.00
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Bibliography on Contaminants and Solubility of Organic Compounds in Oxygen.
P. M. Ordin. 1975, 190p NASA-TM-X-71700, E-8308

Descriptors: *Bibliographies, *Liquid oxygen, *Organic compounds, *Trace contaminants, Aircraft safety, Chemical analysis, Cryogenics, Data bases, Launch vehicles, Reaction kinetics, Safety management.

For abstract, see STAR 1315

N75-24120/8GA PC$3.75/MF$2.25
Old Dominion Univ. Research Foundation, Norfolk, Va.
Interdisciplinary Study of Atmospheric Processes and Constituents of the Mid-Atlantic Coastal Region.
Annual Report, 1 Jun. 1974 - 31 May 1975.
E. C. Kindle, E. C. Bandy, G. Copeland, R. Blais, and G. Levy. May 75, 43p NASA-CR-142820
Contract NGL-47-003-067

Descriptors: *Air pollution, *Pollution control, *Pollution monitoring, *Virginia, Cost analysis, Diffusion coefficient, Landsat 1, Multispectral band scanners, Smoke trails, Vegetation growth.

For abstract, see STAR 1315

N75-24121/6GA PC$5.25/MF$2.25
Old Dominion Univ. Research Foundation, Norfolk, Va.
Interdisciplinary Study of Atmospheric Processes and Constituents of the Mid-Atlantic Coastal Region. Attachment 3: Data Set for Craney Island Oil Refinery Installation Experiment.
E. C. Kindle, A. Bandy, G. Copeland, R. Blais, and G. Levy. May 75, 120p NASA-CR-142823
Contract NGL-47-003-067

Descriptors: *Air pollution, *Oil recovery, *Pollution monitoring, *Virginia, Environment effects, Industrial plants,Tables (Data).

For abstract, see STAR 1315

N75-24122/4GA PC$8.50/MF$2.25
Old Dominion Univ. Research Foundation, Norfolk, Va.
Interdisciplinary Study of Atmospheric Processes and Constituents of the Mid-Atlantic Coastal Region. Attachment 4: Data Set for Background Investigation of Atmospheric Constituents for Nansemond River Site.
E. C. Kindle, E. C. Bandy, G. Copeland, R. Blais, and G. Levy. May 75, 261p NASA-CR-142821
Contract NGL-47-003-067

Descriptors: *Air pollution, *Industrial plants, *Oil recovery, *Pollution monitoring, *Virginia, Digital data, Graphs (Charts), Meteorological parameters, Particulate sampling, Radiosondes, Tables (Data).

For abstract, see STAR 1315

N75-24163/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. National Space Technology Labs., Bay Saint Louis, Miss.
Water Hyacinths and Alligator Weeds for Removal of Silver, Cobalt, and Strontium from Polluted Waters.
B. C. Wolverton, and R. C. Mcdonald. May 75, 14p NASA-TM-X-72727

Descriptors: *Cobalt, *Silver, *Strontium, *Water pollution, Carcinogens, Heart diseases, Plant roots, Radioactive wastes, Trace contaminants, Water treatment.

For abstract, see STAR 1315

N75-24164/6GA PC$5.25/MF$2.25
Old Dominion Univ. Research Foundation, Norfolk, Va.
Interdisciplinary Study of Atmospheric Processes and Constituents of the Mid-Atlantic Coastal Region. Attachment 5: Data Set for Background Investigation of Atmospheric Constituents for Richmond, Virginia Area.
E. C. Kindle, A. Bandy, G. Copeland, R. Blais, and G. Levy. May 75, 108p NASA-CR-142822

Contract NGR-47-003-067

Descriptors: *Air pollution, *Pollution monitoring, *Virginia, Digital data, Graphs (Charts), Meteorological parameters, Particulate sampling, Radiosondes, Tables (Data).

For abstract, see STAR 1315

N75-24165/3GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Atmospheric Pollution. Part 1: Smoke and Sulfur Dioxide. Part 2: Precipitation Measurements Using Storage Gages Pollution Atmospherique. I.Fumee et SO2 II.Mesure des Retombees Su Moyen des Jauges de Depot.
Monthly Bulletin, May 1973.
May 73, 40p
Subm-Prepared Jointly with Inst. D'Hyg. Et d'Epidemiol.
In French and Dutch.

Descriptors: *Air pollution, *Belgium, *Precipitation (Meteorology), *Smoke, *Sulfur oxides, *Tables (Data), Air sampling, Rain gages, Weather stations.

For abstract, see STAR 1315

N75-24166/1GA PC$3.75/MF$2.25
Institut Royal Meteorologique de Belgique, Brussels.
Atmospheric Pollution. Part 1: Smoke and Sulfur Dioxide. Part 2: Precipitation Measurements Using Storage Gages Pollution Atmospherique I.Fumee et SO2 II.Mesure des Retombees au Moyen des Jauges de Depot Bulletin Mensuel, Juin 1973.
Monthly Bulletin, Jun. 1973.
Jun 73, 37p
Subm-Prepared Jointly with Inst. D'Hyg. Et d'Epidemiol.
In French and Dutch.

Descriptors: *Air pollution, *Belgium, *Precipitation (Meteorology), *Smoke, *Sulfur oxides, *Tables (Data), Air sampling, Rain gages, Weather stations.

For abstract, see STAR 1315

PB-231 665-32/GA PC$3.75/MF$2.25
Environmental Protection Agency, Washington, D.C.
Summaries of Foreign Government Environmental Reports.
Apr 75, 39p
Also available on subscription $35.00/year domestic and $45.00/year foreign.

Descriptors: *Environments, *Pollution, Air pollution, Noise(Sound), Radiation hazards, Solid waste disposal, Water pollution, Pesticides, Australia, Belgium, Brazil, Bulgaria, Canada, Costa Rica, France, Germany, Japan, Norway, Romania, Spain, Sweden, USSR, Israel, Italy, Malaysia, Mexico, Switzerland, Dominican Republic, Great Britain, Colombia, Netherlands, Bibliographies, Abstracts, Translations.

This is a monthly announcement listing of foreign documents received through exchange agreements. This series, devoted to summaries of government reports and other pertinent literature and focusing on the legislative, organizational, economic, and social aspects of environmental protection, supplements foreign scientific and technical literature abstracted by other EPA information services.

PB-242 018/0GA PC$4.75/MF$2.25
Battelle Columbus Labs., Ohio.
Reclamation of Metal Values from Metal-Finishing Waste Treatment Sludges.
Final rept.,
Arch B. Tripler, Jr., R. H. Cherry, Jr., and G. Ray Smithson, Jr. Apr 75, 97p EPA/670/2-75-018

Descriptors: *Electroplating, *Metal finishing, *Industrial waste treatment, *Materials recovery, Reclamation, Sludge, Sludge disposal, Ion exchanging, Spectrochemical analysis, Leaching, Cost estimates, Electrowinning, Pilot plants, Questionnaires.
Identifiers: Waste recycling, Secondary materials industry.

The efforts of this program have included the determination of the worth of recovering metal values from metal-finishers' wastewater treatment sludges, the definition and research of processes for such recovery, and the selection, design, and costing of a recommended process. The study included a survey of the literature to determine the state-of-the-art regarding the generation, disposal, and recovery treatment practices relevant to metal-finishers' sludges, and to identify metal recovery processes possibly applicable to those sludges. This information was supplemented with a survey by questionnaire to determine the current status of relevant practices and conditions. Field investigations provided detailed examples of plant practices, sludge storage conditions, and sludge characteristics. The extraction of metal values from waste sludges by various leaching agents, and the recovery of metal values by techniques including electrowinning, cementation, and liquid-liquid ion exchange were studied. A portable pilot process for the treatment of waste sludges and recovery of metal values was selected and equipment and operating costs developed.

PB-242 075-01/GA PC$15.00/MF$15.00
Environmental Protection Agency, Washington, D.C. Library Systems Branch.
EPA Reports Bibliography Quarterly. A Listing of EPA Reports Entered Into the National Technical Information Service, January, February, March 1975.
1975, 84p*
See also PB-238 800. Also available on subscription $45.00/domestic, $60.00/foreign.

Descriptors: *Pollution, *Bibliographies, *Air pollution, *Water pollution, *Solid waste disposal, *Noise pollution.
Identifiers: *Environmental Protection Agency.

The quarterly bibliography series supplements the original one (EPA-LIB-73-01; PB-223 693) dated July 1973 and the first supplement (EPA-LIB-74-03; PB-234 215) dated August 1974, and the second supplement (PB-238 800) dated December 1974. It contains citations, abstracts and author, corporate source, subject, contract, and title indexes for all U.S. Environmental Protection Agency and its predecessor agencies' reports entered into the NTIS collection in the period noted.

PB-242 095/8GA PC$4.25/MF$2.25
State Univ. of New York at Stony Brook. Urban Science and Engineering.
Networks and Vehicle Routing for Municipal Waste Collection.
Urban and policy studies,
Edward J. Beltrami, and Lawrence D. Bodin.
Aug 72, 52p UPS-72-18 NSF/RA/S-72-003
Grant NSF-GI-34842

Descriptors: *Municipal services, *Vehicles, *Waste disposal, Collecting methods, Routing, Problem solving, Networks, Analog systems, Urban information systems, Deployment, Technology innovation, Sites, Delay time.

Vehicle routing for municipal waste collection encompasses a variety of problems. This paper focuses on some operational problems regarding waste collections. These problems include the efficient routing of collection vehicles through a set of nodes in a network or along its branches. Because the task is one of collection with disposal as a terminal operation at the dumpsites, the problem is not too unlike that of the truck delivery problem. For this reason, the techniques for solving some of these problems developed in this paper should be of interest to those concerned with pickup and delivery problems.

PB-242 168/3GA PC$4.25/MF$2.25
Maryland State Highway Administration, Brooklandville. Bureau of Research.
Investigation of a Vibratory Electronic Device for Non-Destructive In-Place Measurement of Various Pavement and Soil Layers.
Final rept.,
A. D. Martin, Lincoln L. Donaldson, and F. Stanley Kinney. Nov 74, 66p

Descriptors: *Flexible pavements, *Pavement bases, *Vibration tests, Nondestructive tests, Vibrational spectra, Vibration meters, Exciters, FORTRAN, Computer programs.
Identifiers: FORTRAN 4 programming language, DOT/4CZ/CA, DOT/4IZ/IC.

This final report describes the instrumentation of a vibratory electronic device (V.E.D.) which was to be used in nondestructive in-place measurement of flexible pavements in determining the thickness and strength of the constituent layers which make up such pavements. The theory and procedure followed were adopted from different authors as set forth in the bibliography. Results obtained from the adopted procedure, comments on the results and conclusions are included.

PB-242 183/2GA PC$5.75/MF$2.25
Brookhaven National Lab., Upton, N.Y.
Promoting the Utilization of Solid Waste Glass-Polymer Composite Technology in the Public and Private Sectors.
Final rept.,
B. Manowitz, L. E. Kukacka, M. M. Small, and M. Steinberg. Oct 74, 134p NSF/RA/R-74-056
Grant NSF/AG-522
Prepared in cooperation with Associated Universities, Inc., New York.

Descriptors: *Composite materials, *Sewer pipes, *Technology transfer, Scientific research, Solid waste disposal, Glass, Concrete, Polymers, Research management, Marketing, Government policies, National government, State government, Product development, Reclamation.
Identifiers: *Glass recycling, *Polymer concretes, Waste recycling.

This report was part of a larger effort to explore how best to transfer technology which had originated in Federal Laboratories to the civilian/commercial sector. In this report, Brookhaven discusses the actions undertaken to transfer its Glass-Polymer Composite sewer pipe technology to several local governments in the Eastern United States. Problems which were encountered and their attempted solutions are described, and recommendations for certain policy actions by the federal government are identified.

PB-242 232/7GA PC$4.25/MF$2.25
Illinois Univ., Chicago. Coll. of Engineering.
Per Passenger-Mile Energy Consumption and Costs for Suburban Commuter Service Diesel Trains.
Final research rept. Sep 73-Aug 74,
Edward W. Walbridge. Aug 74, 65p RR-12
UNTA-IL-11-0006-74-1

Descriptors: *Rail transportation, *Passenger transportation, *Mass transportation, *Diesel locomotives, *Fuel consumption, Electric power demand, Air pollution, Urban areas, Equipment, Cost estimates.

Identifiers: *Electric power consumption, DOT/4DZ/DC.

Results presented in this report are based on data obtained from Chicago, Illinois' three diesel commuter railroads. Operations and equipment are described, particularly in terms of energy consumption and pollutant production. Service characteristics, such as average occupancy and average trip distance, and energy consumption results are presented and discussed.

PB-242 246/7GA PC$4.25/MF$2.25
Aerospace Corp., El Segundo, Calif. Urban Programs Div.
Medium Duty Vehicle Emission Control Cost Effectiveness Comparisons. Volume I. Executive Summary,
M. G. Hinton, J. Meltzer, T. Iura, J. A. Drake, and L. Forrest. Jan 74, 57p* ATR-74(7327)-1-Vol-1
EPA/460/3-74-004-a
Contract EPA-68-01-0417
Paper copy also available in set of 2 reports as PB-242 245-SET, PC$11.00.

Descriptors: *Air pollution control equipment, Hydrocarbons, Comparison, Cost effectiveness, Cost estimates, Trucks, Automobiles, Capitalized costs, Carbon monoxide, Nitrogen oxides, Exhaust gases, Electric power plants, Operating costs.
Identifiers: *Air pollution control, *Medium duty vehicles, Emission inventories, Heavy duty vehicles.

This report, presents the results of a comparative analysis of the cost effectiveness of medium-duty vehicle. Volume I, presents a concise review of important findings and conclusions in the Highlights and Executive Summary sections. It compares emission control cost factors (expressed as dollars expended per ton of pollutant removed) of medium duty vehicles (MDVs--6000 to 14000-lb GVW), light duty vehicles (LDVs--less than 6000-lb GVW), heavy duty vehicles (HDVs--greater than 14000-lb GVW), utility power plants, and a number of other stationary sources. Mobile source emission inventories were calculated for the New York City, Los Angeles, and Phoenix-Tucson Air Quality Control Regions. The results indicate that, in the mobile source area, emission control cost factors ($/ton) in general decrease in numerical value as the vehicle weight increases. This same size effect was noted in stationary source cost factor comparisons, where the cost factors decreased in numerical value as the system size (or flow rate of the product being controlled) increased.

PB-242 260/8GA PC$4.25/MF$2.25
Gillette Research Inst., Inc., Rockville, Md.
Feasibility of Using Sewage Sludge in Highway Embankment Construction.
Interim rept. Jul 74-Feb 75,
A. Kawam, L. M. Smith, J. Ross, H. G. Larew, and L. Rude. Feb 75, 51p FHWA-RD-75-38
Contract DOT-FH-11-8122

Descriptors: *Sludge disposal, *Reclamation, *Earth fills, *Soil stabilization, Highways, Embankments, Solid waste disposal, Construction materials, Fly ash, Calcium oxides, Calcium sulfates, Compressive strength, Permeability, Durability, Leaching, Trace elements, Water pollution.
Identifiers: *Highway embankments, DOT/4CZ/CA, Sewage sludge.

A laboratory evaluation of the feasibility of using sewage sludge in construction of a highway embankment was conducted. Mixtures composed of lime, fly ash, waste calcium sulfate and up to 17% sewage sludge were evaluated. The effect of lime type, fly ash source and the relative proportions of lime, fly ash and waste calcium sulfate on compressive strength of compacted specimens was measured. Two soils, one sandy and the other clayey, were used to replace 30, 50 and 70% of the fly ash in selected formulations. All samples with the soil replacement exceeded the minimum strength gain criterion. Selected formulations were further evaluated for volume change, durability, permeability and leachability. Analysis of the leachate from the permeability tests indicated that the heavy metals present in the sewage sludge--cadmium, chromium, mercury and zinc--were retained in the mixture. However, lime and gypsum did increase the pH and calcium and sulfate ion concentrations in the leachate.

PB-242 303/6GA PC$5.75/MF$2.25
Nevada Univ., Reno. Center for Water Resources Research.
Environment: A Bibliography on Social Policy and Humanistic Values.
Project rept. no. 31,
Robert Roelofs, and William Jenkins. May 75, 143p W75-08489, OWRT-A-039-NEV(1)
Contract DI-14-31-0001-3228

Descriptors: *Environmental quality, *Social planning, *Bibliographies, Social conditions, Water quality, Social effect, Environmental issues, Policies, Value, Indexes(Documentation), Technology assessment.

The comprehensive bibliography contains over 3,000 items covering published material on and related to the environment as it pertains to social policy and humanistic values. Material was selected if it was substantively, methodologically or theoretically relevant to man and his activities in relation to the environment. The bibliography is compiled alphabetically by author with a cross-referenced category index of fifty-six subjects.

PB-242 335/8GA PC$4.75/MF$2.25
Pacific Northwest Environmental Research Lab., Corvallis, Oreg.
Nitrogen and Phosphorus in Wastewater Effluents. (A Preliminary Analysis of National Eutrophication Survey Data Collected During the 1972-73 Sampling Period.)
Preliminary rept.
Jul 74, 83p Working Paper-22

Descriptors: *Water pollution, *Phosphorus, *Nitrogen, *Sewage treatment, Surveys, Municipalities, Concentration(Composition), Inorganic phosphates, Inorganic nitrates, Nutrients, Water quality, Periodic variations, Chemical properties, Tables(Data), Eastern Region(United States).
Identifiers: *Sewage treatment plants.

Monthly effluent samples collected for a period of one year were analyzed for nitrogen and phosphorus content. Over 500 municipal sewage treatment plants in the eastern United States were involved in the program. Although there was wide variation between plants, median total phosphorus and total nitrogen concentrations were 5.89 mg/l and 15.00 mg/l respectively. The median annual per capita load discharged was 2.2 lbs phosphorus/capita/year and 6.0 lbs nitrogen/capita/year.

PB-242 362/2GA PC$3.25/MF$2.25
California Univ., Berkeley. Sanitary Engineering Research Lab.
Solar Energy Fixation and Conversion with Algal Bacterial Systems.
Semi-annual progress rept. 1 Jul-30 Sep 74,
Moshe Uziel, William J. Oswald, and Clarence G. Golueke. 4 Dec 74, 18p SERL-74-3, NSF/RANN/SE/GI-39216/PR/74/3 NSF/RA/N-74-195
Grant NSF-GI-39216
Report on Algae Solar Project Publication VI.

Descriptors: *Fermentation, *Methane, *Algae, *Solar energy, Nitrogen, Sludge digestion, Energy transfer, Nitrogen fixation.

The overall objective of the study is to explore the feasibility of a process which is based on the utilization of algal-bacterial cultures integrated in such a manner that solar energy is 'fixed' into algal cellular material--material which in turn is converted to methane by way of anaerobic digestion. The process is coupled with waste-water treatment and nutrient recycle. An important specific objective is the assessment of the economic feasibility of the solar energy fixation-methane-production system in terms of generation of electricity through the combustion of the methane and of the recycling of the nutrients in waste water. A second important specific objective is an assessment of the comparative fermentability of several species of algae. This phase experimental work concludes the study of fermentation kinetics and comparative fermentability of six species of algae.

PB-242 391/1GA PC$4.75/MF$2.25
Science Applications, Inc., McLean, Va.
Surface Effects Skimmer Developments.
Final rept.,
Nicholas P. Trentacoste. Jun 75, 79p
EPA/670/2-75/066
Contract EPA-68-03-0327

Descriptors: *Skimmers, *Oils, *Water pollution, Hydrofoils, Design, Nozzles, Materials recovery, Foam, Polyurethane resins, Ocean waves.
Identifiers: Oil spills, *Oil pollution removal, Water pollution control, Surface effect.

This experimental program investigated the use of a Surface Effects Skimmer in removing thin film oil slicks spread over large water areas by fast currents. This new skimmer uses a directed air jet to separate and lift spilled oil from the surface of the water in the form of a spray consisting of oil and water droplets. The oil/water spray is directed toward a rotating belt of polyurethane foam from which it is squeezed and pumped to a nearby storage tank. Tow tank tests were conducted at speeds up to 3.25 knots in calm, choppy and smooth wave conditions with oils ranging from a very viscous Venezuelan crude to a very light No. 4 distillate fuel oil. In a related series of experiments, it was found that presoaking the polyurethane foam belt in either water or oil had no effect on its ability to retain oil.

PB-242 420/8GA PC$7.25/MF$2.25
Louisiana State Univ., Baton Rouge. Div. of Engineering Research.
Numerical Analysis of Embankments Over Soft Soils.
Final rept.,
Robert L. Thoms, Richard A. Pecquet, and Ara Arman. Jun 75, 212p Bull-112
Prepared in cooperation with Louisiana Dept. of Highways, Baton Rouge.

Descriptors: *Embankments, *Soil mechanics, Displacement, Consolidation, Creep rate, Numerical analysis, Settlement, Computer programs, Louisiana.
Identifiers: DOT/4BZ/BA, Finite element analysis, SSOILS computer program.

A computer program, SSOILS, for analyzing displacements of embankments over soft soils is presented. Background development research, both experimentation, is discussed in the early chapters of the study. The final chapter (7) of the study is essentially self contained and is written for the user who must rely on standard soil tests to obtain input data for the computer program. Immediate (or initial) displacement, and time dependent displacement of settlement due to 2-D consolidation and creep can be accounted for by the pro-

gram; however, users must become familiar with the program and interpretation of soil test data (for input data) in order to make good use of the program as an aid to the engineering analysis of embankment behavior over soft soils.

PB-242 423/2GA PC$3.60/MF$2.25
Transportation Research Board, Washington, D.C.
Traffic Control and Motorist Information,
Philip J. Tarnoff. 1975, 91p* TRB/TRR-531, ISBN-0-309-02378-5

Descriptors: *Vehicular traffic control, *Urban transportation, Research, Traffic signals, Automation, Transportation management, Urban traffic control systems, Highway bridges, Symbols, Freeways, Signal devices.

The six papers define some of the operational problems that traffic, safety, and freeway surveillance specialists must face while fulfilling their responsibilities. They include identification of the presence of data errors inherent in the operation of a computerized traffic-control system and suggested measures to minimize the effects to have an operation that is better than a pretimed system; a presentation of 2 data collection techniques that were employed to evaluate various combinations of signs to warn motorists of potentially icy bridges; a description of the installation of a series of diagrammatic signs and their effectiveness; a determination of motorists' preferences for the type of real-time information desired for route-diversion signing; preferences for the type of real-time information desired for route-diversion signing; the development of a systematic procedure for the determination of signal settings in a network; and a discussion of the theory and fundamentals of progressively timed signal systems whose objective is the achievement of maximum possible bandwidth.

PB-242 438/0GA PC$7.25/MF$2.25
Metropolitan Transportation Commission, Berkeley, Calif.
A Generalized No-BART Alternative Transportation System.
Final rept.
Mar 75, 220p FR-1-14-75
Contract DOT-OS-30176
Prepared in cooperation with McDonald and Smart, San Francisco, Calif., and Peat, Marwick, Mitchell and Co., San Francisco, Calif.

Descriptors: *Rapid transit railways, *Transportation planning, California, Transportation problems, Selection, Decision making, Policies, Financing, Travel demand, Urban transit systems.
Identifiers: BART(Bay Area Rapid Transit), Bay Area rapid transit, San Francisco(California), DOT/1B, DOT/2C.

The report formulates the generalized No-BART alternative transportation developments for use in the BART Impact Program. Based upon policy assumptions defining the probable decision environment in the San Francisco Bay Area, alternative transportation developments which are likely to have been implemented in the absence of the Bay Area Rapid Transit system have been identified. The policy assumptions are documented by interviews with decision-makers and documentary research in decision variables such as planning, growth trends, transportation demands, interest group influences, and financing sources.

PB-242 439/8GA PC$5.25/MF$2.25
Metropolitan Transportation Commission, Berkeley, Calif.
Transportation System and Travel Behavior Project Research Plan.
Planning document,
Raymond H. Ellis, Richard D. Worrall, and Alistair Sherret. May 75, 122p PD-14-3-75
Contract DOT-OS-30176
Prepared in cooperation with Peat, Marwick, Mitchell and Co., San Francisco, Calif., and Urban Mass Transportation Administration, Washington, D.C.

Descriptors: *Rapid transit railways, *Transportation management, California, Urban transit systems, Economic impact, Travel patterns, Travel demand, Transportation deveviopment, Vehicular traffic.
Identifiers: BART(Bay Area Rapid Transit), Bay Area rapid transit, DOT/1B, DOT/2C.

The Transportation System and Travel Behavior (TSTB) Project of the BART Impact Program will assess the impacts of BART upon the characteristics and performance of the Bay Area transportation system--including BART, parallel and complementary transit services, and the highway system--and the responses of travelers to BART and related transportation system changes, including traveler perceptions, attitudes, and behavior. The report includes discussion of a conceptual framework of the impacts processes, the major research questions to be addressed, the priorities for the research, the research methods, and finally, the major work elements of the TSTB Project.

PB-242 440/6GA PC$4.25/MF$2.25
Metropolitan Transportation Commission, Berkeley, Calif.
Survey of Data Sources for the Land Use and Urban Development Project. Working Paper,
Andrejs Skaburskis. Jun 75, 71p WP-13-5-75
Contract DOT-OS-30176
Prepared in cooperation with Department of Housing and Urban Development, Washington, D.C.

Descriptors: *Rapid transit railways, *Transportation management, California, Land use, Residential buildings, Commercial buildings, Property values, Transportation routes, Economic impacts.
Identifiers: BART(Bay Area Rapid Transit), Bay Area rapid transit, DOT/1B, DOT/2C.

The report identifies data sources which appear relevant to the study of BART's impacts on land use. The purpose of this report was to help design a Research Plan for the BART Impact Program Land Use Project. Thirty-seven data sources are described in detail. Use of the data and some analytical methods are described.

PB-242 466/1GA PC$5.75/MF$2.25
Pennsylvania Dept. of Environmental Resources, Harrisburg.
Architectural Measures to Minimize Substance Damage.
Final rept.,
Chuan Y. Chen, Yon N. Chen, and Donald V. Gaffney. Dec 74, 143p* ARC-73-111-2551
Grant ARC-73-111/ARK-2551
Prepared by Michael Baker, Jr., Inc., Beaver, Pa., BAKER-ARK-75-05.

Descriptors: *Subsidence, *Structural analysis, Structural design, Soil mechanics, Underground mining, Structures, Damage, Mass movements(Geology), Prevention, Surfaces, Settlement(Structural), Control, Soil stabilization, Buildings, Pipes(Tubes).

The study provides the architectural and engineering professions with principles and criteria for the design and construction of buildings, structures, and underground utilities to minimize subsidence damage resulting from underground mining. State-of-the-Art information on the mechanics, controlling parameters, and prediction of surface subsidence is discussed. Subsidence related ground movements are studied for their effect on structures, and several case histories are presented. Minimization of structural damage is presented as obtained through Precautionary Measures and Preventive Works. Precautionary Measures include proper design and construction of new structures with consideration for subsidence effects. Preventive Works involve procedures taken to prepare an existing structure for subsidence effects. Recommendations are based primarily on the success and adaptability of European technologies. Relevant domestic and foreign literature is referenced throughout as a guide for specialized study.

PB-242 530/4GA PC$5.25/MF$2.25
Wendell Associates, McLean, Va.
A Study of Prospective Water Pollution Control Activities for the Ohio River Valley Water Sanitation Commission (ORSANCO).
Final rept.,
Mitchell Wendell. Mar 75, 109p EPA/905/9-75-003
Contract EPA-68-01-2631

Descriptors: *Water quality management, *Organizations, *Ohio River Valley, Water pollution, Research projects, Waste disposal, Ground water, Water pollution standards, Oil spills, Monitoring, Stream flow, Mathematical models, Law enforcement, Mine waters, Electric power plants, Regional planning.
Identifiers: Water pollution abatement.

ORSANCO (Ohio River Valley Sanitation Commission) is an interstate agency. The study analyzes and recommends prospective roles that this agency can best perform which would be complementary to or in lieu of activities for which the member States of the federal government is responsible in controlling and abating water poilution in the Ohio River drainage basin.

PB-242 534/6GA PC$3.75/MF$2.25
National Environmental Research Center, Gig Harbor, Wash. Northwest Water Supply Research Lab.
Study of Corrison Products in the Seattle Water Department Tolt Distribution System.
Environmental protection technology series,
Robert A. Dangel. May 75, 30p EPA/670/2-75/036

Descriptors: *Water quality, *Metals, *Water pipelines, Corrosion products, Trace elements, Water distribution, Potable water, Bacteria, Turbidity, Dissolved gases, Oxygen, Chemical properties, pH, Alkalinity, Chlorides, Fluorides, Washington(State).
Identifiers: Water quality data, Dissolved oxygen, Seattle(Washington).

Samples from the Seattle Water Department's Tolt distribution system were analyzed for chemical and bacteriological parameters. Changes from the raw water quality were observed, particularly in trace metal concentrations and other parameters related to corrosion. Distribution mains were found to be adequately protected from corrosion by cement and bituminous linings whereas service lines and household plumbing were actively corroded. Metals in the microgram/l concentration range were determined by a flameless atomic absorption technique.

PB-242 542/9GA PC$8.50/MF$2.25
California Univ., Santa Barbara. Marine Science Inst.
Oil Spill and Oil Pollution Reports, November 1974-February 1975.
Quarterly rept. Nov 72-Feb 75,
Floyd A. DeWitt, Jr., and Penelope Melvin. May 75, 271p* EPA/670/2-75-044
Contract EPA-R-803063
See also PB-240 719.
Paper copy also available from GPO.

Descriptors: *Oil spills, *Oil pollution, *Bibliographies, Reviews, Oil pollution control, Detection, Oil pollution removal, Research projects, Patents, Remote sensing, Geophysical prospecting, Environmental issues, Legislation, Design, Prevention, Recovery, Materials handling, Containment.

The November 1974 - February 1975 Oil Spill and Oil Pollution Reports is the second quarterly compilation of oil spill events and oil pollution report summaries. Presented in the report are: (a) Summaries of oil spill events; (b) summaries and bibliographic literature citations; (c) summaries of current research projects; and (d) patent summaries.

PB-242 559/3GA PC$7.00/MF$2.25
Midwest Research Inst., Kansas City, Mo.
Substitute Chemical Program. Initial Scientific and Minieconomic Review of Captan.
Apr 75, 184p* EPA/540/1-75-012
Contract EPA-68-01-2448

Descriptors: *Fungicides, *Pesticides, Utilization, Chemical properties, Degradation, Chemical reactions, Residues, Toxicity, Food, Reviews, Safety, Hazards, Manufacturing, Cost effectiveness, Chemical analysis.
Identifiers: Cyclohexene dicarboximide/N-trichloromethyl, *Captan, Water pollution effects(Animals).

This is the 5th in a series of in-depth scientific literature searches which review the safety and efficacy of substitute chemicals registered by EPA as possible replacements for cancelled or suspended pesticides or pesticides in litigation. The review covers all uses of captan and is intended to be adaptable to future needs. Chemistry, pharmacology and toxicology, fate and significance in the environment, and production and use are reviewed.

PB-242 578/3GA PC$7.00/MF$2.25
Skelly and Loy, Harrisburg, Pa.
Preparation of Plans and Specifications for Pollution Abatement Activities in Cherry Creek Watershed, Maryland.
Final rept.
Jul 73, 189p ARC-73-35/RPC-767

Descriptors: *Water pollution, *Mine waters, *Cherry Creek, *Casselman River, Drainage, Water quality, Fisheries, Land reclamation, Strip mining, Regional planning, Acidity, Construction, Maryland.
Identifiers: *Mine acid drainage, Water pollution abatement.

The purpose of the project was to prepare plans and specifications which, when executed by a contractor, will abate the acid mine drainage presently polluting Cherry Creek in western Maryland. The abatement of this pollution will allow Cherry Creek to support a fisheries program, and will improve the quality of the water in Deep Creek Lake. The study was performed in conjunction with the Environmental Protection Agency as part of an effort to deal with elimination and control of mine drainage. Benefits other than water quality improvement include the aesthetic benefits from strip mine reclamation since Cherry Creek is adjacent to the large Deep Creek Lake recreation area. The abatement measures will eliminate 95% of the net acid load in the Creek. The total construction project includes two strip mine reclamation sites in the Casselman River watershed.

PB-242 581/7GA PC$10.00/MF$2.25
Maryland Univ., College Park.
Study of the Emissions from Major Air Pollution Sources and Their Atmospheric Interactions.
Progress rept. 1 Nov 72-31 Oct 74,
Glen E. Gordon. Oct 74, 351p NSF/RA/E-74-059
Grant NSF-GI-36338

Descriptors: *Air pollution, *Atmospheric chemistry, Condensation nuclei, Incinerators, Electric power plants, Trace elements, Airports, Highways, Plumes, Particles, Flue gases, Chemical analysis, Nitrogen oxides, Sulfur dioxide, Atmospheric chemistry, Chemical composition, Scientific research, Air quality, Vehicular tunnels.
Identifiers: Air pollution sources, Hydroxyl radicals, Laser spectroscopy, *Air pollution sampling.

The report presents trace element analyses of size-graded particulates from coal- and oil-fired power plants, municipal incinerators, airports, highways, and continental background. Ground level and airborne surveys of power plant plumes have included measurements of condensation nuclei and sulfur dioxide along with observations with an integrating nephelometer and a mass monitor. Other airborne plume surveys investigated interactions between ozone and nitrogen oxides in power plant plumes. Laboratory determinations were made of the kinetic constants of 30 chemical reactions of possible importance in atmospheric chemistry. The design of a laser probe for measuring concentrations of OH radicals in air is reported. Comparisons are reported of the relative performance of different types of cascade impactors. Analytical methodology is discussed.

PB-242 600/5GA PC$5.75/MF$2.25
Fairfax County Office of Research and Statistics, Va.
An Analysis of the Real Estate Data Base and Billing System.
Final rept.,
Ralph R. Young. Mar 73, 143p FXCO/ORS-75/9

Descriptors: *Real estate, *County planning, *Management information systems, *Benefit cost analysis, Virginia, Local government, Municipalities, Property management, Economic analysis, Property taxes, Data acquisition, Data files, Tax collection, Billing, Revenue.
Identifiers: *Municipal information systems, Fairfax County(Virginia).

This document is unique in the information technology literature since it includes a rigorous evaluation of the costs and benefits of the feasibility of implementation of a large, computer-based information system. The particular system evaluation is that of real property data collection, file maintenance, property tax billing, and revenue distribution for Fairfax County, Virginia, a Washington, D.C. suburban jurisdiction which includes 160,000 parcels of land. The purpose of the study is to identify available alternatives and select the alternative which provides the best service at the least cost. The methodology should be useful to anyone who is attempting to select among proposals for information systems on the basis of cost-benefit analysis.

PB-242 601/3GA PC$4.25/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Computer Systems Development Documentation Standards.
Final rept.,
Ralph R. Young. Aug 73, 59p FXCO/ORS-75/16

Descriptors: *County planning, *Management information systems, *Computer programming, Standards, Performance evaluation, Feasibility, Systems engineering, Program design, Management guidelines, Utilization, Virginia.
Identifiers: Municipal information systems, Computer applications, Fairfax County(Virginia).

This volume provides standards for the evaluation, design, development, and implementation of computer-based information systems. It includes an overview of the systems development life cycle, and guidelines for the feasibility study, the general design document, the detail design document, program standards, catalogued procedure standards, the implementation plan, and the post-implementation evaluation. The standards have been successfully utilized and have been instrumental in achieving effective implementation of planned systems development projects.

PB-242 602/1GA PC$5.75/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Systems Plan for Fiscal Year 1975.
Final rept.,
Ralph R. Young. Oct 74, 132p FXCO/ORS-75/17

Descriptors: *County planning, *Management information systems, *Computer programming, Local government, Objectives, Systems analysis, Feasibility, Project planning, Performance evaluation, Information retrieval, Virginia.
Identifiers: Municipal information systems, Fairfax County(Virginia), Computer applications.

This volume provides comprehensive short-range plans for a large local government for development and implementation of computer-based information systems. It discusses the use of information technology to meet organizational goals and objectives; sets specific objectives for a particular fiscal year; reviews planning and evaluation activities including systems studies, feasibility studies, and evaluations of existing systems; and presents resource requirements for and capabilities of planned systems development projects. A discussion of data base management is included.

PB-242 606/2GA PC$6.25/MF$2.25
Texas Univ. at Austin. Div. of Natural Resources and Environment.
Establishment of Operational Guidelines for Texas Coastal Zone Management. Resource Capability Units I: Assessment of Locational Effects of Residential, Commercial and Industrial Expansion in the Corpus Christi Area, Texas - Methodology.
Final rept. 1 Jun 72-31 May 74,
Robert S. Kier, William A. White, and William L. Fisher. 31 May 74, 164p NSF/RA/E-74-049
Grant NSF-GI-34870
See also PB-242 607.

Descriptors: *Coastal zone management, *Texas, Land use, Water resources, Environmental quality, Assessment, Economic development, Shores, Residential buildings, Commercial buildings, Industrial buildings, Policies, Flood plains, Islands(Landforms).

The report concerns the efforts of a multidisciplinary group to develop, apply, and evaluate a methodology for considering environmental and economic effects of alternative coastal zone management policies for the Texas Coastal Zone. Specific goals of the team were: (1) To establish operating criteria specific to the Texas Coastal Zone by which to assess the economic and environmental impact of implementing various policies, (2) to develop a systematic approach for this evaluation that allows comparison between impacts of various policies projected to 1980 and 1990, and (3) to integrate and test the methodology by applying it to differing, but hypothetical policies: (a) no change from 1970 public policy, (b) no development within 1,500 feet of the waterline after 1980, and (c) improved waste water treatment. The principal purpose of this study was to provide an environmental base line against which to measure the consequences of man's activities and future economic development in the Coastal Zone and the effects of potential management policies. Portions of this document are not fully legible.

PB-242 607/0GA PC$8.75/MF$2.25
Texas Univ. at Austin. Div. of Natural Resources and Environment.
Establishment of Operational Guidelines for Texas Coastal Zone Management. Resource Capability Units II: Land Resources of the Coastal Bend Region, Texas.
Final rept. 1 Jun 72-31 May 74,
Robert S. Kier, William A. White, and William L. Fisher. 31 May 74, 281p NSF/RA/E-74-050
Grant NSF-GI-34870
See also PB-242 606 and PB-242 608.

Descriptors: *Coastal zone management, *Texas, Land use, Soils, Hydrology, Flood plains, Island(Landforms), Dunes, National parks, Wildlife, Bays(Topographic features), Estuaries, Reservoirs, Hydrogeology, Mineral deposits.
Identifiers: Corpus Christi(Texas).

In this report land resources of the Coastal Bend region have been analyzed in terms of their natural carrying capacity considering (1) geology, soils, and substrate, (2) biology, (3) hydrology, (4) physical properties, (5) chemistry, and (6) natural processes. Forty-three distinct land and water environments with similar carrying capacity or like ability to sustain man's use were delineated. These units are classified according to their association together in natural systems, including (A) coastal plain system, (B) active floodplain system, (C) barrier island system, (D) biologic system, (E) manmade system, (F) bay, lagoon, and estuary system, and (G) manmade and natural water system. The environmental data gathered in the study provided the basis for projecting the consequence of economic and demographic expansion and implementing certain Coastal Zone management policies in the four-county Corpus Christi area. Portions of this document are not fully legible.

PB-242 608/8GA PC$11.25/MF$2.25
Texas Univ. at Austin. Div. of Natural Resources and Environment.
Establishment of Operational Guidelines for Texas Coastal Zone Management. Economics and Land Use: Technical Assessment of Environmental Policy Impacts in the Corpus Christi Area of Texas.
Final rept. 1 Jun 72-31 May 74,
Kingsley E. Haynes, and Jared E. Hazleton. 31 May 74, 436p NSF/RA/E-74-051
Grant NSF-GI-34870
See also PB-242 607.

Descriptors: *Coastal zone management, *Texas, Mathematical model, Demography, Population growth, Land use, Industries, Residential buildings, Environmental impacts, Assessments, Economic forecasting, Urban areas, Transportation, Demand(Economics), Supply(Economics), Policies.
Identifiers: Corpus Christi(Texas).

The overall goal of the project reported on is to develop and test a methodology for assessing the economic and environmental impacts of alternative public policies for management of Coastal Zone environmental resources. The objectives of the task force established to assist in this project were twofold: (1) to develop and evaluate input/output and demographic models to project under varying assumptions the level of economic activity by industrial sector and the expected level of population in the Coastal Bend Region; and (2) to develop and assess a land use model to spatially allocate households and industry within the study region. Three alternative policies are examined: (1) The No Change Policy; the 1,500 Foot Policy, which prohibits new construction within 1,500 feet of the coast line after 1980; and (3) the Zero Discharge Policy, which assumes 'Best Available Treatment' of waste by 1980 and zero discharge of waste water pollutants by 1990. The impact of these policies is considered in the light of several different future projections. Portions of this document are not fully legible.

PB-242 610/4GA PC$10.50/MF$2.25
Maryland Dept. of Natural Resources, Annapolis. Program Planning and Evaluation.
Mine Drainage Pollution Watershed Survey. Cherry Creek, Casselman River Watersheds, Garrett County, Maryland.
Final rept.
May 73, 417p ARC-72-47-May-73
Grant ARC-42-47/RP-228

Descriptors: *Water pollution, *Mine waters, *Surface waters, *Cherry Creek, *Casselman River, Surveys, Tables(Data), Mines(Excavations), Strip mining, Acidity, Ecology, Aquaticbiology, Stream flow, Water quality, Land reclamation, Inorganic sulfates, Iron, Maryland.
Identifiers: *Mine acid drainage, Water pollution abatement, Water quality data, Garrett County(Maryland).

The purpose of the project was to perform a detailed study which would develop and recommend an abatement plan designed to eliminate the deleterious effects of mine drainage pollution within the designated study areas. The study was performed within a framework of a logical series of phases and milestone goals. These were (1) collect and review data, (2) reconnaissance, (3) one-year control sampling (4) field explorations, (5) subsurface explorations, (6) interpret aquatic biota study, (7) mine development drawing, (8) evaluate sources and abatement measures. It was concluded that Cherry Creek is the most polluted stream, unfortunately, from natural sources more than mine drainage. It was recommended that emergency engineering design of the abatement plan be implemented at once. Color illustrations reproduced in black and white.

PB-242 618/7GA PC$4.25/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.
Sulfur Oxide Throwaway Sludge Evaluation Panel (SOTSEP). Volume I: Executive Summary.
Final rept.,
Frank T. Princiotta. Apr 75, 73p EPA/650/2-75-010-a
See also Volume 2, PB-242 619.

Descriptors: *Scrubbers, *Sludge disposal, *Desulfurization, *Electric power plants, Sulfur oxides, Flue gases, Coal, Combustion, Fly ash, Limestone, Air pollution, Ponds, Earth fills, Solid waste disposal, Flue dust, Trace elements, Regulations, Utilization, Byproducts, Particles.
Identifiers: *Air pollution control, Limestone scrubbing, Sanitary landfills, Particulates.

Contents: Definition of the problem-Availability of alternative SOx control technology, Potential demand for lime/limestone scrubbing, Quantification of the problem and comparison with analagous environmental problems, Relationship between sulfur oxide scrubber sludge, standards/regulations, and enforcement, Nature of the material, References, Approaches to disposing of or utilizing scrubber sludge materials--Commercial utilization, Present and planned utility industry disposal programs, Disposal by ponding, Disposal by landfill, Other disposal methods, Current EPA R&D programs, References, Alternative sulfur by-products.

PB-242 619/5GA PC$9.25/MF$2.25
National Environmental Research Center, Research Triangle Park, N.C. Control Systems Lab.
Sulfur Oxide Throwaway Sludge Evaluation Panel (SOTSEP). Volume II: Technical Discussion.
Final rept.,
Frank T. Princiotta. Apr 75, 314p EPA/650/2-75-010-b
See also Volume 1, PB-242 618.

Descriptors: *Sludge disposal, *Desulfurization, *Electric power plants, *Scrubbers, Sulfur oxides, Flue gases, Flue dust, Fly ash, Coal, Combustion, Limestone, Air pollution, Ponds, Earth fills, Solid waste disposal, Trace elements, Regulations, Utilization, Byproducts, Particles, Economic analysis.
Identifiers: *Air pollution control, Limestone scrubbing, Sanitary landfills, Particulates.

The report gives results of an intermedia evaluation of the environmental and economic factors associated with disposal or utilization of sludge from non-regenerable flue gas desulfurization processes. The evaluation was conducted in the context of alternate sulfur oxide control techniques; existing and anticipated air, solid waste, and water standards; and other major influences on the potential generation sludge, its disposal, and the magnitude of potential environmental problems associated with its disposal. This volume gives a comprehensive discussion of each study area and includes backup information and references for the Volume I Summary section.

PB-242 671/6GA PC$4.25/MF$2.25
Halliburton Services, Duncan, Okla.
Development of an Economic/Environmental Plan for Dents Run Watershed, West Virginia.
Final rept.
Mar 73, 70p ARC-73-6/RPC-711

Descriptors: *Regional planning, *Economic development, *Pollution, *Dents Run Watershed, Sewage, Industrial wastes, Waste water, Refuse, Sewage disposal, Water pollution, Air pollution, Coal, Solid waste disposal, Earth fills, Cost estimates, West Virginia.
Identifiers: Monongalia County(West Virginia).

The study was initiated to inventory environmental detriments, other than acid mine drainage pollution, in the Dents Run watershed near Morgantown, West Virginia and to recommend a plan for the correction of these problems. Plans were prepared for these significant sources of pollution: wastewater (sewage or industrial), solid waste, junk cars, and burning coal refuse piles. Short and long range programs were developed and five priorities determined. The first is sewage disposal for individual rural homes, followed by banking burning coal refuse. Long range program priorities included sewage disposal for the Dents Run area, collection and disposal of solid waste, a county-wide program to remove junk cars, the establishment of a covered bridge as a tourist attraction, road repairs, and the enlargement of an existant public park.

PB-242 721/9GA PC$7.00/MF$2.25
Environmental Quality Systems, Inc., Washington, D.C.
Determination of Estimated Mean Mine Water Quantity and Quality from Imperfect Data and Historical Records.
Final rept.
Jan 73, 176p ARC-72-108/RPC-728

Descriptors: *Water pollution, *Mine waters, *Monongahela River Basin, Drainage, Acidity, Mathematical models, Statistical analysis, Concentration(Composition), pH, Sources, Iron, Tables(Data), Sulfates, Manganese, West Virginia, Pennsylvania, Maryland.
Identifiers: Mine acid drainage, Water pollution abatement, Water quality data.

The report is one of a series dealing with different aspects of environmental pollution in the Monongahela River Basin. The purpose of the study on which this report is based was to develop a methodology determining this increase or decrease and the sources of pollution when complete data is not available. Special attention was given to acid mine drainage.

PB-242 722/7GA PC$5.75/MF$2.25
Ackenheil and Associates Geo Systems, Inc., Pittsburgh, Pa.
Evaluation of Pollution Abatement Techniques Applicable to Lost Creek and Brown's Creek Watershed, West Virginia.
Final rept.
31 Oct 73, 146p ARC-73-7/RPC-746

Descriptors: *Water pollution, *Mine waters, *Lost Creek, *Browns Creek, *Monongahela River Basin, Cost effectiveness, Drainage, Water quality, Land reclamation, Osmosis, Sewage treatment, Sampling, Benefit cost analysis, West Virginia.
Identifiers: *Mine acid drainage, *Water pollution abatement, Harrison County(West Virginia), *Water quality data.

The study report is one of a series dealing with the development of an overall pollution abatement plan for Lost Creek and Brown's Creek of the Monongahela River Basin. This particular report is an evaluation of various methods of acid mine drainage abatement in terms of their cost effectiveness utilizing value reduction techniques.

PB-242 733/4GA PC$4.25/MF$2.25
Terraspace, Inc., Rockville, Md.
Correlation of Data on Liquid Jet Cutting of Rocks and Other Materials.
Final rept. Mar 73-Dec 74,
William C. Cooley. Jan 75, 57p TR-407-1
NSF/RA/T-74-088
Grant NSF-GI-37194

Descriptors: *Hydraulic jets, *Cutting, *Tunneling(Excavation), Rocks, Metals, Nozzle flow, Jet mixing flow, Fluid flow, Correlation techniques.

A method has been developed using dimensionless parameters to correlate data on the depth of slots cut in materials by traversing high-pressure continuous liquid jets. It is a generalization of an equation presented by Nikonov and Goldin for application to rocks and coal. In addition to the effect of jet pressure and traverse velocity, it permits taking account of the jet and material densities, standoff distance from the nozzle to the material surface, and the nozzle discharge coefficient. The effect on jet coherence of nozzle Reynolds number and the effect of turbulence and vorticity produced by the feed system at the inlet of experimental nozzles have not been included, although they are believed to be significant factors.

PB-242 737/5GA PC$6.25/MF$2.25
Computran Systems Corp., Hackensack, N.J.
Feasibility of an Exclusive Bus/Car Pool Lane on New Jersey Route 3. Volume I.
Interim rept. on Phase 1,
V. J. Blue, D. J. Parietti, and B. Adler. May 75, 161p FH-8312-1
Contract FH-11-8312

Descriptors: *Limited access highways, *Traffic lanes, *Vehicular traffic control, *Computerized simulation, Traffic flow, Mathematical models, Vehicular traffic, Passenger transportation, Buses(Vehicles), Automobiles, Traffic direction, Traffic peaks, Benefit cost analysis, New Jersey.
Identifiers: DOT/5L, Exclusive bus lanes, Car pools, PRIFRE computer program, Local studies.

The feasibility of setting aside one lane for the exclusive use of bus and car pools on New Jersey Route 3 was performed. The PRIFRE Model, a computer model which determines traffic conditions for normal and priority operations, was calibrated to represent Route 3. Numerous configurations of bus and car pool lanes were identified, and five priority configurations were modeled for eastbound traffic. Three other priority configurations were modeled for eastbound traffic. Three other priority configurations were modeled for westbound traffic. A major criteria in the analysis is the occupancy shifts required in terms of cumulative passenger hours, travel time, vehicle miles traveled, and traffic operations. A benefit-cost analysis was performed including consideration to user and system costs. The report contains a recommendation that the state of New Jersey implement a bus and car pool lane in each direction according to specified criteria.

PB-242 742/5GA PC$3.75/MF$2.25
Bechtel Corp., San Francisco, Calif.
Research Program Plan for Meeting Tomorrow's Needs in Tunneling and Excavation. Executive Summary.
Feb 74, 34p NSF/RA/T-74-086
Grant NSF-C841
See also PB-242 777.

Descriptors: *Tunneling(Excavation), *Research management, Research projects, Construction, Economics, Benefit cost analysis, Construction equipment, Construction management.

This report presents the summary of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation. The results of the study, which are delineated in the main report and accompanying appendices, contain supporting evaluations.

PB-242 767/2GA PC$4.25/MF$2.25
Maryland Dept. of Natural Resources, Annapolis. Program Planning and Evaluation.
The Cherry Creek-Casselman River Environmental Improvement Plan.
Final rept.,
Louis G. Hecht, Jr. Jan 74, 57p ARC-72-47-Jan-74
Grant ARC-72-47/RP-228

Descriptors: *Water pollution, *Regional planning, *Cherry Creek, *Casselman River, Environmental protection, Coal mining, Solid waste disposal, Industries, Water supply, Water resources, Land use, Transportation, Economic development, Watersheds, Maryland.
Identifiers: *Mine acid drainage.

The survey was conducted to develop a plan for environmental improvement of the Cherry Creek Basin and the Maryland portion of the Casselman River Basin. It included identification and evaluation of environmental needs associated with coal mining, sewerage, solid waste and industrial operations as well as resource development needs associated with water supply, community development, transportation, and general land use. Environmental restoration was the main priority. Each problem is assessed in terms of its contribution to the overall degradation of the watershed and the current status of corrective action. The plan provides a framework for consideration of funding individual or group environmental improvement in the Cherry Creek-Casselman River watersheds.

PB-242 777/1GA PC$10.00/MF$2.25
Bechtel Corp., San Francisco, Calif.
Research Program Plan for Meeting Tommorrow's Needs in Tunneling and Excavation.
Final rept.
Mar 74, 357p NSF/RA/T-74-087
Grant NSF-C841
See also PB-242 742.

Descriptors: *Tunneling(Excavation), *Research management, *Urban areas, Research projects, Construction, Economics, Construction equipment, Benefit cost analysis, Construction management.

This report presents the results of a study performed by Bechtel Corporation for the National Science Foundation, Research Applied to National Needs (RANN). The purpose of the study is to develop a recommended long range research program plan in tunneling and excavation for RANN. The objective of the RANN tunneling and underground excavation research program is to achieve technological improvements that would enhance the quality of life in urban areas through more economic and effective utilization of the underground space.

PB-242 790/4GA PC$8.50/MF$2.25
Gibbs and Hill, Inc., New York.
Development of an Overall Economic/Environmental Plan for the Monongahela River Basin.
Final rept.
Sep 74, 254p ARC-72-86/RPC-712

Descriptors: *Water pollution, *Mine waters, *Monongahela River Basin, Drainage, Economic development, Sewage, Industrial wastes, Refuse, Water quality, Disposal, Earth fills, Strip mining, Air pollution, Standards, West Virginia, Pennsylvania, Maryland.
Identifiers: Mine acid drainage, *Water pollution abatement.

The study is one of a series of reports being prepared for the ARC (Appalachian Regional Commission) for the development of an overall environmental pollution abatement plan for the Monongahela River Basin with special attention to mine drainage. The Basin is an 18-county area encompassing parts of Appalachian West Virginia, Pennsylvania, and Maryland. The study was performed under an agreement between the ARC and the Environmental Protection Agency. It is felt that if pollutants and other environmentally degrading problems can be alleviated, other public and private investments will provide greater opportunities to improve the economy of the Basin. The result of the study should suggest courses of action for selecting priorities for environmental and associated projects to Federal, State and local decision-makers and the private sector as well as clarifying the Basin's potential for economic development.

PB-242 860/5GA PC$10.25/MF$2.25
Geraghty and Miller, Inc., Port Washington, N.Y.
Ground Water Pollution Problems in the Northwestern United States,
Frits van der Leeden, Lawrence A. Cerrillo, and David W. Miller. May 75, 378p* EPA-660/3-75-018
Contract EPA-68-03-0298

Descriptors: *Water pollution, *Ground water, *Northwest Region(United States), Mine waters, Water quality, Septic tanks, Industrial wastes, Salinity, Irrigation, Oil spills, Tailings, Sewage treatment, Waste disposal, Fertilizers, Pesticides, Salt water intrusion, Agricultural wastes.
Identifiers: Feedlot wastes, Mine acid drainage.

An evaluation of ground-water problems has been carried out in six states in the northwest: Colorado, Idaho, Montana, Oregon, Washington and Wyoming. There is a need for baseline water quality data and systematic evaluation of

overall ground-water conditions, especially in urban zones, in areas of petroleum exploration and development, and at locations of mining and industrial activity. The most common natural ground-water quality problems, other than high salinity, are excessive hardness, iron, maganese, and fluoride. Principal sources of man-caused ground-water quality problems in the approximate order of severity are: discharge of effluent from septic tanks and sewage treatment plants, irrigation return flow, dryland farming, abandoned oil wells, shallow disposal wells, unlined surface impoundments, mine tailings and mine drainage, municipal and industrial landfills, and radioactive waste disposal. Other sources that appear to be of less importance but still must be considered include: spills and leaks, application of fertilizers and pesticides, feedlots, and salt-water intrusion.

PB-242 865/4GA PC$6.25/MF$2.25
Idaho Univ., Moscow. Dept. of Agricultural Economics.
An Economic Analysis of the Effects of a Declining Ground Water Level in the Raft River Basin, Cassia County, Idaho.
Master's thesis,
Henry Lee Schatz. Mar 74, 166p W75-08921, OWRT-B-019-IDA(1)

Descriptors: *Water management, *Ground water, *Raft River Basin, Economic analysis, Aquifers, Pumping, Benefit cost analysis, Farm crops, Linear programming, Economic impacts, Irrigation, Farm management, Theses, Idaho.
Identifiers: *Water levels, Cassia County(Idaho), *Overdraft, Water management(Applied).

Several strategies are available for groundwater management. An economic analysis of four alternatives and their consequences is presented as part of a study to: (1) Estimate the economic value of water pumped from the aquifer system in the Raft River, (2) estimate the benefits and costs associated with varying rates of groundwater decline in the basin on returns to farms, and (3) estimate the opportunity cost by not pumping the groundwater. Data pertaining to costs of production, returns from crops, agricultural practices, and cropping patterns were gathered in 1972 to provide the information base for this study. Linear programming analysis using information from the activity budgets for producing crops was applied to estimate returns to operator labor and management. The impact from various rates of water level decline on the 20 year accumulated present value of net returns and annual annuity values for a farm were also estimated.

PB-242 885/2GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. F1, Automobile Occupancy.
Final rept. 1969-70,
Harry E. Straite. Apr 72, 33p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents automobile occupancy rates by major purposes of the trip, as well as place of residence of principal driver of the automobile, day of the week, length of trip and by time of day by hour that the trip was started.

PB-242 886/0GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 2, Annual Miles of Automobile Travel.
Final rept. 1969-70,
Harry E. Straite. Apr 72, 33p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Ownership.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents the effect of seven selected variables on automobile use expressed in average annual miles per vehicle. These seven variables were: number of cars in household, age of automobile by year-model, cars purchased new or used, annual income of household, occupation of principal driver and place of residence.

PB-242 887/8GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 3, Seasonal Variations of Automobile Trips and Travel.
Final rept. 1969-70,
Harry E. Straite. Apr 72, 30p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas.
Identifiers: DOT/5L, DOT/4DZ/DB.

Seasonal patterns of automobile trips and vehicle-miles of travel are examined within four selected parameters: (1) place of residence; (2) purpose of trip; (3) length of trip; and (4) day of the week that the trip was started.

PB-242 888/6GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 4, Transportation Characteristics of School Children.
Final rept. 1969-70,
Darrell A. Beschen, Jr. Jul 72, 34p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Children, School, Students, Bicycles, Buses(Vehicles).
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents data on travel patterns to school of students between 5 and 18 years of age in kindergarten through grade 12. For each grade level, home-to-school travel by various modes of transportation including school bus, public transportation, automobile, and bicycle as well as walking is analyzed in terms of distance to school (miles) and time from home-to-school (minutes).

PB-242 889/4GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 5, Availability of Public Transportation and Shopping Characteristics of SMSA Households.
Final rept. 1969-70,
Rolan M. Hatley. Jul 72, 37p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Passenger transportation, *Travel patterns, *Urban transportation, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Central city, Buses(Vehicles), Shopping centers.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents data on the availability of public transportation to the main business district of the central city for households located in Standard Metropolitan Statistical Areas (SMSA's) and information on shopping characteristics of SMSA residents. The first part of the report relates size of SMSA and household income by race of household head and by nearness of households to public transportation to the main business district of the central city. The second part discusses the frequency with which the heads of SMSA households shop in the main business district of the central city, including reasons for not shopping downtown.

PB-242 890/2GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 6, Characteristics of Licensed Drivers.
Final rept. 1969-70,
Robert E. Gish. Apr 73, 37p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, *Motor vehicle operators, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Licenses.
Identifiers: DOT/5L, DOT/4DZ/DB.

Motor-vehicle drivers are examined within three parameters: (1) geographic distribution; (2) population distribution of licensed drivers by age-groups and sex; and (3) travel distribution of licensed drivers by age-groups, sex and estimated annual miles of driving.

PB-242 891/0GA PC$3.75/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 7, Household Travel in the United States.
Final rept. 1969-70,
Beatrice T. Goley, Geraldine Brown, and Elizabeth Samson. Apr 73, 41p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents daily and annual automobile tripmaking rates by trip purpose, household income and place of residence.

PB-242 892/8GA PC$5.25/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 8, Home-to-Work Trips and Travel.
Final rept. 1969-70,
Ruth H. Asin, and Paul V. Svercl. Aug 73, 107p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Ownership, Employment.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report discusses characteristics of home-to-work travel by various modes of transportation and by population size-group of the workers' place of residence. The first part of the report presents characteristics of the worker by place of residence and place of employment, and the characteristics of travel such as distance, time, daily home-to-work trips, miles of travel and trip lengths by mode and by place of residence. The second part of the report discusses the modes of transportation used by workers and how income, occupation and age of workers affect choice of transportation mode. The third part of the report stresses the role of the automobile, as the predominant mode of home-to-work travel.

PB-242 893/6GA PC$4.25/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 9, Mode of Transportation and Personal Characteristics of Tripmakers.
Final rept. 1969-70,
Alice Randill, Helen Greenhalgh, and Elizabeth Samson. Nov 73, 51p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Buses(Vehicles), Subway railways, Railroads, Aircraft.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents personal characteristics of all individuals 5 years old and over who reported making a one-way trip by a motorized vehicle, including automobile (driver and passenger separately), motorcycle, truck, schoolbus, taxicab, bus, subway, train, and airplane. The percent distributions of these trips by mode are related to age, sex, race, and place of residence in unincorporated areas and incorporated places.

PB-242 894/4GA PC$5.25/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 10, Purposes of Automobile Trips and Travel.
Final rept. 1969-70,
Ruth H. Asin. May 74, 101p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Ownership, Employment, Recreation.
Identifiers: DOT/5L, DOT/4DZ/DB.

The report presents data on automobile trips (one-way) and vehicle-miles of travel and trip length according to the four major trip purposes for which the trip was made: earning a living, family business, educational, civic and religious, and social and recreational. The first part of the report discusses trip purpose as related to population size-groups in incorporated places and unincorporated areas, as well as Standard Metropolitan Statistical Areas (SMAS's); trip length, age of driver, occupation, household income, hour of the day trip started, season of the year and the number of occupants per trip. The second part of the report examines the relationship of the number of cars owned per household to the distribution of automobile trips and vehicle-miles of travel by trip purpose and trip length. In addition, daily and annual tripmaking rates are included.

PB-242 895/1GA PC$4.25/MF$2.25
Federal Highway Administration, Washington, D.C. Office of Highway Planning.
Nationwide Personal Transportation Study. Report No. 11, Automobile Ownership.
Final rept. 1969-70,
Ruth H. Asin, and Paul V. Svercl. Dec 74, 75p*
Paper copy also available in set of 11 reports as PB-242 884-SET, PC$33.00.

Descriptors: *Automobiles, *Passenger transportation, *Travel patterns, Census, Travel habits, Urban areas, Vehicular traffic, Statistical data, Standard metropolitan statistical areas, Ownership.
Identifiers: DOT/5L, DOT/4DZ/DB.

The effect of selected variable on car ownership is examined. First part of the report relates car ownership to place of residence of driver, household composition and income. The second part of the report relates car ownership to characteristics of the automobile including age of automobile and automobile ownership rates by place of residence and household income. The third part of the report relates car ownership to characteristics of vehicle trips and vehicle-miles of travel and person trips and person-miles of travel.

PB-242 896/9GA PC$11.25/MF$2.25
Charlotte, N.C. USAC Project.
Charlotte USAC Project: Relocation Services Module Computer Program Descriptions.
Initial task completion rept.
May 75, 440p USAC-CNCO-0170, MIS-4302/011/01
Contract HUD-H-1216

Descriptors: *Local government, *Urban information systems, *Housing projects, *Computer programming, Housing studies, Resources, Relocation, Displacement, Management information systems, Computer programs, Urban renewal, North Carolina.
Identifiers: *Charlotte(North Carolina), USAC project, Integrated municipal information systems.

The document describes the entire computer program set for the housing relocation services module within the Charlotte IMIS system. Information is provided in sufficient detail to accommodate the transfer of responsibility for program adaption, error checking, and modification from the original program developers to other parties. Also included is an indication of the tasks implemented by the program set described. This document discusses the operational roles and interrelationships of the computer programs which support the initially implemented module capabilities. Included within this document is a complete and detailed description of each computer program (excluded vendor supplied system software) used in module operations.

PB-243 029/6GA PC$6.25/MF$2.25
Clark County, Arkadelphia, Ark.
A Model Countywide Collection and Disposal System for Clark County, Arkansas.
Final rept.
1975, 169p EPA/530/SW-84d
Grant EPA-S-801760

Descriptors: *Solid waste disposal, *Rural areas, Arkansas, Collection, Refuse disposal, Regional planning, Containers, Earth fills, Site surveys, Geology, Water pollution, Demography, Capitalized costs, Operating costs, Trucks, Drainage.
Identifiers: Sanitary landfills, Water pollution sampling, *Clark County(Arkansas).

The purpose of this project was to establish a model county-wide rural collection system and sanitary landfill. For the most part, four-cubic-yard containers were used to provide collection service for rural and unincorporated areas. A sanitary landfill was established to serve the entire county. The final report describes the planning, design, implementation and cost of the county-operated collection and disposal operation and also provides a detailed account of a major dump closing.

PB-243 297/9GA PC$5.75/MF$2.25
Fairfax County Office of Research and Statistics, Va.
Feasibility of Computerized Land Title Search in Fairfax County.
Feasibility study,
Hilary Lerner. Feb 75, 134p* FXCO/ORS-75/2

Descriptors: *Land titles, *Records management, Data processing, Microfilm, Information retrieval, Local government, Municipalities, Management information systems, Virginia.
Identifiers: Fairfax County(Virginia), Municipal information systems.

Land title recording generally ignores modern information technology. The title search process is governed by practices developed by the real estate industry, sanctioned by court decisions, and perpetuated by statutes which keep costs to the home buyer unecessarily high and prevent reforms which would benefit consumers. Five possible avenues of reform are explored: voluntary improvement of procedures by the (elected) Clerk of Courts; microfilming deed books, possibly using computer output microfilm equipment; contracting with an outside firm to create a 'title plant' and certify titles; provision of uncertified titles by the local government based on existing records; development of a county-operated combined computer and manual system which would verify and certify titles.

13C. Construction Equipment Materials, and Supplies

AD-A011 935/4GA PC$4.25/MF$2.25
Texas A and M Research Foundation College Station
Realistic Mixture Design Requirements for Asphalt Stabilized Base Courses.
Final rept. Nov 69-Apr 73,
Jon A. Epps, B. M. Gallaway, and W. A. Dunlap.
Jun 75, 74p AFWL-TR-73-35
Contract F29601-70-C-0008

Descriptors: *Pavements, *Asphalt, Bitumens, Test methods, Formulations, Porosity, Temperature.
Identifiers: *Flexible pavements, Aggregates, Design.

This research examines a realistic approach for bituminous mix design for asphalt stabilized base courses. It concludes that the Air Force should continue using the Marshall Test Method for bituminous mixture design, but that current requirements for percent air voids in the mixture and percent voids filled with bitumen are too restrictive. It further concludes that test temperatures should be reduced from 140F for base course mixture design.

AD-A012 110/3GA PC$3.25/MF$2.25
Army Construction Engineering Research Lab Champaign Ill
An Investigation of Techniques for Achieving Exposed Aggregate Surfaces for Site-Cast Concrete.
Final technical rept.,
Daniel J. Naus, Randy Freeman, Wayne Muir, and G. R. Williamson. Jun 75, 22p Rept no. CERL-TR-M-61-Rev

Descriptors: *Concrete, *Surface finishing, *Buildings, Casting, Formulations, Costs, Military facilities, Army.
Identifiers: Aggregates.

This report describes techniques for producing acceptable exposed aggregate finishes for site-cast concrete, including chemical retardation and mechanical methods. Potentially promising techniques are evaluated with regard to labor requirements, material requirements, cost factors, and limitations.

AD-A012 119/4GA PC$3.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Investigation of High-Strength Frost-Resistant Concrete.
Final rept.,
William O. Tynes. Jun 75, 38p Rept no. AEWES-Misc-Paper-C-75-6

Descriptors: *Concrete, Frost, Mixtures, Air entrainment, Vibration, Compressive properties, Freezing, Thawing.
Identifiers: *Frost resistance, *Frost action, *Air entrained concrete.

This study was conducted to determine if reduction in air content by vibration of a well proportioned concrete mixture of relatively high cement content reduces the frost resistance of the hardened concrete and also to determine the effect of such reduction in air content on compressive strength. One 3/4-in. (19.0-mm) maximum-size crushed limestone aggregate concrete mixture was proportioned to have a compressive strength of approximately 5500 pst (37.92 MPa) at 28 days age. The mixture had an air content of 8 plus or minus %. Various vibration times were used to reduce the air content until the samples had an air content as low as could be practically obtained. Specimens were cast for determining compressive strength, resistance to freezing and thawing, and air void parameters to evaluate the effect of reduction in air content of the concrete on strength and frost resistance.

AD-A012 273/9GA PC$3.75/MF$2.25
Blachford (H L) Inc Troy Mich Noise Control Consulting Div
Development of a Noise Reduction Cab for the U.S. Army 10,000 Lb. Rough Terrain Forklift Truck.
Final technical rept.,
Robert N. Baker. May 75, 37p
Contract DAAK02-73-C-0473

Descriptors: *Forklift vehicles, *Noise reduction, Vibration isolators, Acoustic absorption, Trucks, Army equipment.
Identifiers: Truck cab interiors.

A noise control operator cab has been developed for the U.S. Army 10,000 Lb. Rough Terrain Forklift Truck (RTFT). The cab reduces noise at the operator's ear by 11 dB(A). Attenuation due to the cab appears to be limited primarily by vibrational excitation of the cab structure.

COM-75-50353/2GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Fiber-Reinforced Cementitious Materials.
Final rept.,
J. Clifton, and G. Frohnsdorff. 1975, 34p
Pub. in Special Review in Cements Research Progress 1974, p201-234.

Descriptors: *Reinforced concrete, *Fiber composites, Cements, Glass fibers, Gypsum, Metal fibers, Reinforcing steels, Fibers.
Identifiers: *Fiber reinforced composites, Reprints.

The review is concerned with developments, through 1974, in the research and technology, but not applications, of fiber reinforced cementitious materials including hardened cement pastes of gypsum, portland and high alumina cement and their concretes. Essentially, only materials reinforced with short, discontinuous and discrete fibers are covered, because long rods, continuous meshes and woven fabrics are not classified as discrete fibers in this review.

PB-242 302/8GA PC$3.75/MF$2.25
Stanford Univ., Calif. Dept. of Civil Engineering.
Expansive Cement Concrete-Micromechanical Models for Free and Restrained Expansion.
Final rept.,
Cedric W. Richards, and Richard A. Helmuth.
Jan 75, 42p* CE-TR-191
Grant NSF-GK-34011

Descriptors: *Expanding cements, *Prestressed concrete, *Expansion, Sulfates, Aluminates, Stresses, Particle size, Calcium inorganic compounds, Hydration, Mechanical properties, Crack propagation, Mathematical models, Shrinkage.
Identifiers: Ettringite, Calcium aluminate sulfates, Shrinkage compensating cement.

A micromechanical model of the expansive process in sulfoaluminate expansive cement has been developed. An example of the calculation of free expansion based on the model is given for a Type K shrinkage-compensating cement. Parameters used in the calculation include the chemical composition of the unhydrated cement, its particle size distribution, and the water-cement ratio of the cement paste. The calculated expansion has been verified by experimental measurements. The model has been extended to the case of restrained expansion, based on the assumption of a limiting stress, above which ettringite formation is effectively prevented. From the geometry of the model an equation is developed which relates the unit expansion to the fractional area of restraining steel. The form of the equation compares favorably with experimental data on restrained expansion. Further analysis suggests that there is an upper limit to the magnitude of stress that can be developed by a given cement.

PB-242 422/4GA PC$3.00/MF$2.25
Transportation Research Board, Washington, D.C.
Cement-Aggregate Reactions,
John E. Bukovatz. 1975, 74p* TRB/TRR-525, ISBN-0-309-02372-6

Descriptors: *Cement aggregate reactions, *Concrete pavements, Carbonate rocks, Alkali aggregate reactions, Crack propagation, Bridge decks, Highways, Limestone, Expansion, Concrete durability, Minerals, Petrography.

Contents:
Kansas concrete pavement performance as related to D-cracking;
Expansion of reactive carbonate rocks under restraint;
15 years of living at Kingston with a reactive carbonate rock;
Reaction products in expansion test specimens of carbonate aggregate;
Developments in specification and control;
The Uhthoff Quarry alkali-carbonate rock reaction:
a laboratory and field performance study;
Bridge deck deterioration promoted by alkali-carbonate reaction:
a documented example.

13D. Containers and Packaging

AD-A011 762/2GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
Two-Tank Sequencer for Control of Liquid Nitrogen Withdrawal.
Interim rept.,
John R. Shepherd, and Robert L. Corbin. 19 May 75, 8p Rept no. TR-0075(5270-30)-4
SAMSO-TR-75-137
Contract F04701-74-C-0075

Descriptors: *Liquefied gases, *Storage tanks, *Liquid nitrogen, Monitoring, Depletion, Timing circuits, Control sequences, Cryogenics.

A circuit is described for automatically changing from an empty LN2 tank to a full one without undue interruption of cryogenic cooling.

13E. Couplings, Fittings, Fasteners, and Joints

AD-A012 009/7GA PC$7.00/MF$2.25
Mcdonnell Aircraft Co St Louis Mo
Reliability of Step-Lap Bonded Joints.
Final rept. Jan 74-Apr 75,
E. B. Birchfield, R. T. Cole, and L. F. Impellizzeri. Apr 75, 180p AFFDL-TR-75-26
Contract F33615-74-C-3015

Descriptors: *Bonded joints, *Airframes, Structural engineering, Fiber reinforced composites, Titanium alloys, Reliability, Graphite, Epoxy resins, Carbon fibers, Modulus of elasticity, Computer programs, Strength(Mechanics), Jet fighters, Flight loads.
Identifiers: F-15 aircraft, Carbon fiber reinforced plastics, Graphite reinforced composites.

The objective of the program was an improved technology base of data and methods applicable to the efficient design of graphite-epoxy to titanium step-lap-bonded airframe joints that are optimized for reliability under military flight loading. A random spectrum was used in repeated load tests to establish a data base for defining lifetime and residual strength characteristics. Static strength tests were also conducted which show good comparison with prediction of an elastic-plastic analysis procedure. The static strength, residual strength and lifetime data were assumed to be from Weibull distributions. The shape and scale parameters for each of these distributions were calculated using the best linear unbiased (BLU) estimation procedure. Using these procedures wearout models were calibrated and checked, and conclusions concerning scaling, and translation of parameters were drawn. Tests were also conducted to determine the effect upon lifetime of load truncation, load frequency, relaxation time between missions, and temperature.

AD-A012 081/6GA PC$3.25/MF$2.25
Naval Intelligence Support Center, Washington, D.C. Translation Div.
Calculating Combined Pressed Joints (Raschet Kombinirovannykh Pressovykh Soedinenii),
M. A. Saltykov, M. N. Gorbunov, and B. F. Yakunin. 28 May 75, 16p Rept no. NISC-Trans-3674
Trans. of Sudostroenie (USSR) n2 p46-50 1973.

Descriptors: *Shafts(Machine elements), *Joints, Fittings, Machine shop practice, Tolerances(Mechanics), Torque, Translations, USSR.
Identifiers: *Pressed fittings.

AD-A012 118/6GA PC$3.75/MF$2.25
Army Engineer Waterways Experiment Station Vicksburg Miss
Investigation of Nonmetallic Waterstops. Report 9. Final Report of Effect of Exposure,
Billy J. Houston. Jun 75, 47p Rept no. AEWES-TR-6-546-9
See also Report no. 8 dated Jan 72, AD-737 174.

Descriptors: *Joints, *Plastic seals, Synthetic rubber, Rubber, Polyvinyl chloride, Environmental tests, Exposure(General).

Identifiers: *Waterstops, *Check structures, *Construction joints.

Samples of natural rubber, synthetic rubber, and polyvinyl chloride (PVC) waterstops (stressed, unstressed, and embedded) were exposed at Treat Island, Maine; at St. Augustine, Florida; near St. Louis, Missouri; near New Orleans, Louisiana; and at Jackson, Mississippi, to determine the effect of various exposure conditions. The exposure conditions were as follows: (a) exposure to freezing and thawing in a marine environment, (b) exposure to wetting and drying in a warm marine environment, (c) outdoor exposure in a moderate climate, (d) indoor exposure (air without sunlight), (e) exposure in a weak solution of sodium and magnesium sulfate, (f) exposure to cold contaminated water, (g) exposure to cold fresh water, (h) exposure to warm contaminated water, and (i) exposure to warm fresh water. The samples were exposed during the period 1957-1959, and visual inspections of the exposed specimens were made periodically.

13F. Ground Transportation Equipment

N75-23987/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Unique Concept for Automatically Controlling the Braking Action of Wheeled Vehicles During Minimum Distance Stops.
D. E. Barthlome. May 75, 34p NASA-TM-X-72665

Descriptors: *Automatic test equipment, *Brakes (For arresting motion), Control equipment, Equipment specifications, Performance.

For abstract, see STAR 1315

PB-242 835/7GA PC$4.25/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Advertising and Concessions Policy Study.
Forecast: 1990.
Jan 71, 62p WMATA-75/18
Prepared by Allen Associates, Inc., Arlington, Va.

Descriptors: *Subway railways, *District of Columbia, *Transportation planning, Advertising, Forecasting, Revenue, Terminal facilities, Services, Transportation management, Urban transportation, Urban planning.
Identifiers: Local studies.

The report provides guidelines toward the development of an advertising and concessions policy for within the Metro system of the Washington metropolitan area. The report looks at the pros and cons of advertising and concessions within the rapid rail system, the types of each which might be permitted, and specific locations for advertising and concessions within cars and stations; finally, a set of guidelines was developed suggesting how both advertising and concessions could be regulated, controlled, and administered. The report concludes that a well-controlled advertising and concessions program would be beneficial to both WMATA and its patrons and, by the year 1990, could produce slightly over $1 million in annual income to WMATA.

PB-242 836/5GA PC$3.75/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Impact on Ridership and Revenue of Selected Extensions to the ARS.
Forecast: 1990.
Oct 73, 29p WMATA-75/19
See also PB-184 237. Prepared by Pratt (R. H.) Associates, Inc., Kensington, Md.

Descriptors: *Subway railways, *District of Columbia, *Transportation planning, Transit riders, Revenue, Operating costs, Routes, Stations, Urban transportation, Urban planning.

The purpose of the study was to estimate ridership, revenue, and operating costs for the year 1990 that would result from the extension of two lines of the Metro rapid rail system which is to serve the Washington metropolitan area.

PB-242 837/3GA PC$3.25/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Technical Report on the Mid-City Alternative Rail Line Location.
Forecast: 1990.
Jun 69, 25p WMATA-75/20
See also PB-184 237. Prepared by Voorhees (Alan M.) and Associates, Inc., McLean, Va., Rept. no. AMV-R-20-1004(905), and Gilman (W. C.) and Co., Inc., McLean, Va.

Descriptors: *Subway railways, *District of Columbia, *Transportation planning, Routes, Stations, Transit riders, Revenue, Urban transportation, Urban planning.
Identifiers: Local studies.

The study examines the impact on ridership and revenues of an alternative mid-city alignment of the Greenbelt line of Metro's Adopted Regional System (ARS). The change in alignment involves the substitution of three stations on the proposed alignment under consideration as opposed to two stations on the original route. Two alternatives are studied in the report. First, the realignment of the mid-city portion of the Greenbelt Route from the Gallery Place Station to Columbia Heights is examined; second, this same realignment is considered along with the elimination of the Petworth Station. The report identifies changes that might result in ridership and revenue under each of the alternatives and their impact on WMATA's system-wide projections of ridership and revenue for the year 1990.

PB-242 838/1GA PC$4.25/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Travel Characteristics of the Physically Disabled in the Washington Metropolitan Area.
Mobility study: 1970.
Dec 71, 57p WMATA-75/22
Prepared by Starch (Daniel) and Staff, Inc., Mamaroneck, N.Y.

Descriptors: *Subway railways, *District of Columbia, *Handicapped workers, *Travel patterns, Escalators, Mobility, Interviews, Urban transportation, Terminal facilities, Transportation problems, Transportation planning, Transit riders.
Identifiers: *Physically handicapped persons.

The study investigated the occurrence of disabilities among the population of the Washington metropolitan area and the effect of these disabilities on the use of escalators which had been planned to provide the sole means of access to the Metro rapid rail system. Random telephone interviews were conducted in an attempt to determine the number of physically handicapped within the region; once handicapped individuals were determined through the random survey, follow-up interviews were conducted to provide more detailed information. Information is presented in the study on the nature of the disabilities among those who were interviewed, the use of special aids for mobility, employment status, income, present means of transportation, and a description of the recent types of trips which had been made in the area.

PB-242 839/9GA PC$4.25/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Benefits to the Federal Government from the Adopted Regional Metro System. Technical Appendix.
Oct 68, 51p WMATA-75/23
Prepared by Development Research Associates, Washington, D.C.

Descriptors: *Subway railways, *District of Columbia, *Transportation planning, Construction costs, Benefit cost analysis, Federal support programs, Federal expenditures, Tourism, Economic development, Transportation management, Urban planning.
Identifiers: Local studies.

This report is one of several which assessed the costs and benefits associated with the construction of a rapid rail system for the National Capital Region. The report examined both the direct and indirect benefits to the federal government of the Metro rapid rail system. The study concludes that the federal government will receive 94 cents in direct benefits for every $1 it contributes toward financing the Adopted Regional System (ARS). Some of the direct benefits which contribute to these figures and which are discussed in the report include employee parking, conservation of land, interoffice communication, and a reduction in employee tardiness. Other factors which were considered in the analysis but were not so easily quantified included savings to individual federal employees, the development of tourism, improving the environment of the nation's capital, making for a more efficiently-operating region, and contributing to the development of the national capital region as a showcase for both the nation and the world.

PB-242 840/7GA PC$3.75/MF$2.25
Washington Metropolitan Area Transit Authority, D.C.
Potential Use of Rail Transit by the Physically Disabled in the Washington Metropolitan Area.
Forecast: 1990.
Apr 72, 26p WMATA-75/24
Prepared in cooperation with Pratt (R. H.) Associates, Inc., Kensington, Md.

Descriptors: *Subway railways, *District of Columbia, *Handicapped workers, *Travel patterns, Escalators, Mobility, Urban transportation, Transportation problems, Terminal facilities, Transit riders, Forecasting, Transportation planning.
Identifiers: *Physically handicapped persons

As originally designed, the 98 mile rapid rail system which is to serve the Washington metropolitan area was to use escalators as the sole means of access to all station platforms. This dependence upon escalators would limit the use of the Metro system to those who were capable of using the equipment. Among those most directly affected would be many of the physically handicapped. The purpose of this study was to provide 'low,' 'high,' and 'most probable' estimates of additional Metro usage that would be made possible if inclined or vertical elevators at Metro stations were provided for use by the physically handicapped who, by virtue of their disability, are unable to use an escalator.

PB-242 963/7GA PC$4.75/MF$2.25
Mueser, Rutledge, Wentworth and Johnston, New York.
Subsurface Investigation, Section C009, Huntington Route.
Rept. no. 133.
30 May 75, 96p MRWJ-75-133
Prepared in cooperation with De Leuw, Cather and Co., Inc., Washington, D.C.

Descriptors: *Subway railways, *District of Columbia, *Routes, *Subsurface investigations, Foundations, Rock mechanics, Tunneling(Excavation), Subsurface structures.
Identifiers: Foundation engineering, *Huntington Route, Design section C009.

Results are presented of 41 test borings made along the line of Section C009 of Huntington Route between Braddock Road on the south and Four Mile Run on the north in Alexandria, Virginia of the Washington Metropolitan Area Metro System. The purpose of the work was to provide information for design of surface trackage, cut-and-cover construction, retaining walls and the planned Braddock Road Station. The report contains logs of the test borings, results of laboratory tests on undisturbed samples, a continuous geological section along the line of METRO trackage, sections through the station parking areas and comments regarding anticipated design and construction problems.

PB-243 028/8GA PC$5.75/MF$2.25
Smithers Scientific Service, Inc., Akron, Ohio.
A Study of the Feasibility of Requiring the Federal Government to Use Retreaded Tires.
Final rept.,
William A. Rains, and David E. Williams. May 75, 128p* EPA/530/SW-105c
Contract EPA-68-01-2906

Descriptors: *Tires, *Reconditioning, *Solid waste disposal, Tire treads, National government, Feasibility, Tire wear, Passenger vehicles, Failure, Performance evaluation, Cost analysis.
Identifiers: *Tire retreading, *Retreaded tires.

Tires, which represent only 1.5% of municipal solid waste, pose a special solid waste problem because tires are difficult to dispose of by conventional methods. A partial solution to this problem can be achieved through the reduction of tire waste. One waste reduction option suitable for this is retreading. The report reviews the topic areas pertinent to retreading including the mechanics of tire retreading, the performance of retreaded tires, improving retreadability, and the economics of retreading. Based on these topics the report evaluates the feasibility of requiring the Federal Government to use retreaded passenger tires. The report also examines the solid waste and energy benefits that would be derived by both the Federal Government and the general public through the use of retreaded passenger tires.

13G. Hydraulic and Pneumatic Equipment

AD-A011 720/0GA PC$7.25/MF$2.25
Airesearch Mfg Co of Arizona Phoenix
Hydraulically Variable Torque Converter.
Final rept. 25 Jun 73-25 Aug 74,
R. A. Collins, A. R. S. McCutcheon, and T. C. Ware. Nov 74, 203p Rept no. 74-310916 AFAPL-TR-74-108
Contract F33615-73-C-2076

Descriptors: *Hydraulic equipment, *Torque converters, Gas turbines, Cascade structures, Jets, Aerodynamic slots, Jet flaps, Fluid flow, Jet bombers, Auxiliary power plants.
Identifiers: B-1 aircraft.

This report summarizes the work accomplished under the Contract during the period from July 1973 to August 1974. The principle objectives of this program were to evaluate and demonstrate the technical feasibility of providing a controllable variation in the capacity of a torque converter, operating at a constant input speed, by a new and unique concept. The concept evaluated during this program involved the use of a secondary fluid stream introduced into the primary flow of a torque converter at the stationary reactor section. This technique conceptually acts to turn the direction of the primary flow, thus resembling in performance a mechanically pivoted stator section.

AD-A012 165/7GA PC$3.75/MF$2.25
Harry Diamond Labs Adelphi Md
Fluerics 37: A General Planar Nozzle Discharge Coefficient Representation.
Technical memo.,
Tadeusz M. Drzewiecki. Aug 74, 27p Rept no. HDL-TM-74-5
See also report dated Feb 74, AD-783 479.

Descriptors: *Flueric devices, *Nozzles, Fluid flow, Discharge, Laminar flow, Nozzle area ratio, Fluidics, Reynolds number.
Identifiers: *Discharge coefficients.

This report presents an improved theory for the calculation of incompressible, laminar-flow, nozzle discharge coefficients in planar nozzles. The theory includes the effects of: acceleration of the free stream in a constant area section due to boundary layer growth; three dimensionality, due to corner boundary layer interaction; and, fully developed flow at very low Reynolds numbers due to opposing boundary layer interaction.

PAT-APPL-566 158/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Fluidic Antiskid Circuit.
Patent Application,
Henrik H. Straub. Filed 8 Apr 75, 10p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Aircraft landings, *Landing gear, *Braking, *Fluidic control, Skidding, Detectors, Signal processing, Patents.
Identifiers: *Patent applications, PAT-CL-244-110-A.

The patent application relates to a pneumatic wheel speed sensor which provides pulse frequency proportional to wheel speed. The signal is converted to DC signal and differentiated and compared to commanded deceleration. An error causes modulation of brake pressure. Excessive deceleration causes a digital amplifier to switch into the system integrator resulting in rapid brake pressure signal decrease. Second order lead protects against undesirable landing gear oscillation in aircraft applications.

13H. Industrial Processes

AD-A012 409/9GA PC$3.75/MF$2.25
Union Carbide Corp Tarrytown N Y Linde Div
Research on Materials for Submerged Arc Welding of Titanium.
Final rept. 15 Jun 74-14 Jun 75,
D. C. Hill, and C. L. Choi. Jun 75, 30p
Contract N00014-74-C-0406

Descriptors: *Titanium alloys, *Titanium, *Submerged arc welding, Welding fluxes, Halides, Calcium fluorides, Barium halides, Strontium compounds, Lithium fluorides, Aluminum alloys, Niobium alloys, Tantalum alloys, Molybdenum alloys, Mechanical properties, Microstructure, Toughness.
Identifiers: Barium chlorides, Strontium fluorides, Strontium chlorides, Titanium alloy 6Al 1Mo 2Nb 1Ta.

This report presents the results of a study of halides as candidate materials for submerged arc welding of titanium alloys. Criteria are defined for optimum performance and tests are performed to screen candidate fluxes. CaF2-base fused fluxes are determined to offer preferred welding characteristics. Four promising compositions are identified: CaF2, CaF2-(5%)BaCl2, CaF2-(5%) SrF2. SrCl2 and CaF2-(5%)BaCl2-(2%)LiF. Groove welds were made with CaF2 flux and Ti-6Al-2Cb-1Ta-1Mo wire.

N75-24039/0GA PC$4.25/MF$2.25
Koninklijke/Shell-Laboratorium, Amsterdam (Netherlands).
Determination of Transverse Weld Yield Strength on Thin Plate.
C. Appel. Mar 74, 51p AMSR.0039.74

Descriptors: *Thin plates, *Weld strength, *Yield strength, Computer programming, Iteration, Stress-strain diagrams, Tensile tests, Weld tests, Welded joints.

For abstract, see STAR 1315

PAT-APPL-568 541/GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lyndon B. Johnson Space Center, Houston, Tex.
Surface Finishing.
Patent Application.
J. A. Kinzler, J. T. Heffernan, L. G. Fehrenkamp, and W. S. Lee. Filed 16 Apr 75, 26p NASA-CASE-MSC-12631-1
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Metal finishing, *Surface finishing, *Wings, Adhesives, Aerodynamic stability, Airfoils, Aluminum, *Patent applications, Plastic coatings, Surface roughness.

An airfoil configuration and manufacturing process was designed to reduce or eliminate air turbulence created by surface irregularities in metal due to rivets, wrinkles, and butt-joints. The metal surface of an airfoil was cleaned, then coated with a thin layer of a fluid adhesive over which a sheet of thin plastic film was stretched. Tension was applied to the film and the resultant surface was squeezed to cause the adhesive to conform to the irregularities, remove any bubbles, and smooth out any wrinkles in the film. The adhesive was then allowed to set. The resulting surface is smooth and relatively free of the normal irregularities present in the standard metal airfoil, particularly for low speed aircraft.

13I. Machinery and Tools

AD-A012 114/5GA PC$4.25/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Cutting Frozen Ground with Disc Saws.
Technical rept.,
Malcolm Mellor. Jun 75, 69p Rept no. CRREL-TR-261

Descriptors: *Soils, *Cutting, *Saws, Excavation, Cutting tools, Wear resistance, Silt, Gravel, Performance(Engineering), Costs, Freezing.
Identifiers: *Frozen soils, Disc saws.

The largest commercially available disc saws (7 ft diameter) were tested in frozen ground. Cutting performance was reasonably attractive, specific energy consumption was acceptable, but cutter durability in frozen gravel was judged to be totally inadequate. A new cutter system was developed for the saw that provided best general capabilities, and a dramatic improvement in cutter durability was achieved. The modified saw cut slots 3.7 in. wide and 30 to 34 in. deep at rates up to 6.6 ft/min in coarse frozen gravel and up to 16.3 ft/min in frozen silt.

AD-A012 300/0GA PC$7.25/MF$2.25
Timken Co Canton Ohio
Design, Development and Testing of High Speed Tapered Roller Bearings for Turbine Engines.
Final rept. 1 Jul 72-1 Jul 75,
Robert F. Cornish, Peter S. Orvos, and Gary J. Dressler. Jul 75, 208p AFAPL-TR-75-26
Contract F33615-72-C-1890

Descriptors: *Gas turbines, *Roller bearings, Lubricants, Lubrication, Load distribution, Centrifugal force, Turbine parts, Experimental design.
Identifiers: *Tapered bearings.

The object of this program was to investigate the feasibility of tapered roller bearings to operate under future gas turbine engine requirements of speed and load. A speed of 3,500,000 DN (107.95 mm bore X 32,422 rpm) and 5000 pounds thrust load were set as goals. The analytical work involved defining various bearing parameters that would influence the design and performance under high speed operation. A total of thirty bearings were designed and fabricated for the testing portion of the program.

N75-23999/6GA PC$3.25/MF$2.25
National Engineering Lab., East Kilbride (Scotland).
Sacrificial Cage Materials for the In-Situ Lubrication of Rolling Bearings.
D. Scott, and J. Blackwell. 1975, 19p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Accelerated life tests, *Bearings, *Retaining, *Solid lubricants, *Space environment simulation, Carbon fiber reinforced plastics, Failure analysis, Glass fiber reinforced plastics, Molybdenum disulfides, Polytetrafluoroethylene, Service life, Silicon nitrides, Steels, Tungsten carbides.

For abstract, see STAR 1315

N75-24000/2GA PC$3.25/MF$2.25
Les Applications de Roulement, Thomery (France).
On the Effects of Solid Lubrication on the Torque of a Ball Bearing.
J. C. Manon. 1975, 16p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *D-2 satellites, *Solid lubricants, *Spacecraft environments, *Torque, Coatings, Component reliability, Film thickness, Molybdenum disulfides, Ultrahigh vacuum.

For abstract, see STAR 1315

N75-24001/0GA PC$3.25/MF$2.25
National Aerospace Lab., Amsterdam (Netherlands).
A Testrig to Measure the Thermal Conductance and Friction Torque of Bearings in Vacuum.
J. F. Heemskerk, A. A. M. Delil, and J. P. B. Vreeburg. 1975, 18p
Contract ESTEC-1679/72-PP
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Friction, *Test facilities, *Thermal conductivity, *Torquemeters, Heat balance, Heat generation, Spacecraft environments, Ultrahigh vacuum.

For abstract, see STAR 1315

N75-24003/6GA PC$3.75/MF$2.25
Philips Gloeilampenfabrieken N. V., Eindhoven (Netherlands).
Grease Lubricated Spiral Groove Bearings for Long-Life Systems.
E. A. Muyderman. 1975, 47p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Bearings, *Communication satellites, *Greases, *Reaction wheels, *Service life, Grooves, Lubrication, Momentum, Satellite attitude control.

For abstract, see STAR 1315

N75-24006/9GA PC$3.25/MF$2.25
Centre National d'Etudes Spatiales, Toulouse (France).
Method for Continuous Torque Measurement of Dry Miniature Bearings Methode de Controle de Couple en Continu de Roulements Secs Miniatures.
E. Conde. 1975, 9p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Ball bearings, *Microbalances, *Solid lubricants, *Torquemeters, Miniaturization, Vacuum.

For abstract, see STAR 1315

N75-24007/7GA PC$3.25/MF$2.25
Societe Nationale Industrielle Aerospatiale, Les Mureaux (France). Centre Technique.
Research and Development in the Field of Spacecraft Mechanical Devices Recherches et Developpement dans le Domaine des Mecanismes Spatiaux.
P. Poubeau. 1975, 24p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Bearings, *Mechanical devices, *Ring structures, *Spacecraft instruments, Electric contacts, Low speed, Pivots, Polyimides, Rotating shafts, Sliding friction, Wear.

For abstract, see STAR 1315

N75-24008/5GA PC$3.25/MF$2.25
Deutsche Forschungs- und Versuchsanstalt fuer Luft- und Raumfahrt, Munich (West Germany). Inst. fuer Flugtreib- und Schmierstoffe.
A Dry Lubrication System for Spaceproofed Bearings.
E. Jantzen. 1975, 25p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.

Descriptors: *Ball bearings, *Helios project, *Solid lubricants, *Spacecraft environments, *Spin reduction, Accelerated life tests, Coatings, Friction, Mechanical drives, Retaining, Temperature gradients, Thermal vacuum tests, Ultrahigh vacuum.

For abstract, see STAR 1315

N75-24015/0GA PC$3.25/MF$2.25
Centre National d'Etudes Spatiales, Toulouse (France).
Presentation of Tests on Gears Performed at Cnes Presentation des Essais d'Engrenages Faits au Cnes.
E. Conde. 1975, 25p
Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Gears, *Satellite instruments, Gear teeth, Performance tests, Spacecraft environments, Surface layers, Wear.

For abstract, see STAR 1315

PAT-APPL-576 505/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Separation Spring Actuator.
Patent Application,
C. F. Seifert. Filed 12 May 75, 9p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Ejectors, *Actuators, Springs, Housings(Enclosures), Separation, Patents.
Identifiers: PAT-CL-244-1, *Patent applications.

The patent application relates to an actuator adapted for use in separating two interconnected bodies, while maintaining their respective desired directions. In the preferred embodiment, the actuator includes a housing which supports and guides a captive coiled spring that is adjusted for proper preload compression by a nut, and a center plunger to which is removably connected a bolt, headup. The actuator is attached to one of the interconnected bodies. The proper plunger travel is adjusted by a retraction tool that is then removed; and, the bolt is extended to touch the other interconnected body. When the interconnection is broken, the spring is released and, without changing the direction of the body to which the actuator is attached, imparts the desired direction to the first body.

13J. Marine Engineering

AD/A-012 006/3GA PC$8.75/MF$2.25
Coast Guard, Washington, D.C.
List of Inspected Tank Barges and Tankships.
1 Jan 75, 276p

Descriptors: *Tankers, *Barges, *Marine transportation, Coast Guard, Inspection, Ship hulls, Cargo, Classification, Liquefied natural gas, Petroleum products, Acids, Sulfur, Drydocks.
Identifiers: DOT/4DZ/DD, DOT/2F.

The publication provides information concerning tank barges and tankships certificated by the United States Coast Guard. This list of inspected tank barges is a revision of the publication dated 2 March 1973. The list of tankships is the second step in the development of a publication which contains all Coast Guard certificated tank vessels as is available to the public through the National Technical Information Service.

AD-A011 803/4GA PC$4.25/MF$2.25
Mar Inc Rockville Md
Feasibility Study of Helicopter-Towed Air Cushion Logistic Vehicles.
Final rept. 31 Mar-30 Jun 75,
V. F. Neradka, J. C. Stevens, and R. L. Levin. Jun 75, 68p Rept no. TR-148
Contract N00014-73-C-0178

Descriptors: *Lighters(Boats), *Air cushion vehicles, *Amphibious operations, *Logistics support, Towed vehicles, Hydrodynamic configurations, Stability, Lift, Dynamic loads, Drag, Performance(Engineering), Platforms, Cargo ships, Cost estimates.
Identifiers: RH-53 aircraft, H-53 aircraft, LASH(Lighter Aboard Ships), Lighter aboard ships.

A feasibility study of a helicopter-towed air cushion logistic vehicle (ACLV) was performed. The scope of the study encompassed movement of loaded LASH system lighters on unmanned air-cushion platforms from an offshore ship onto a sand beach in support of amphibious assault operations. Motive power is to be provided by towing with RH-53 helicopter. Color illustrations reproduced in black and white.

AD-A011 808/3GA PC$4.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Penetration of Projectiles into Seafloor Soils.
Final rept. Jul 71-Apr 74,
Daniel G. True. May 75, 63p Rept no. CEL-TR-822

Descriptors: *Anchors(Marine), *Ocean bottom, *Penetration, Penetrometers, Foundations(Structures), Soil resistant properties, Underwater, Soil mechanics.
Identifiers: *Foundation engineering.

This report presents Laboratory model tests and field tests of a study conducted on projectile penetration into seafloor soils. Existing relationships for predicting penetration behavior are considered, and new relationships are developed to account for observed test results. The derived relationships incorporate conventional soil engineering properties with special modifications to account for the effects of velocity, penetrator shape, and penetration depth on penetration resistance. These relationships are shown to compare favorably with previously available methods for predicting penetration depths where soil properties are known. Recommendations are presented for the evaluation of constants in the relationships. A calculation procedure is presented for solving the penetrator equations of motion by hand or with the aid of a small computer. An example problem is solved by hand to illustrate the use of the proposed relationships in the calculation procedure. Recommendations are made for use of results in preliminary and detailed engineering work.

AD-A011 810/9GA PC$3.75/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Behavior of Steel Bar Reinforced Concrete Spheres under Hydrostatic Loading.
Technical note Jun 71-Oct 73,
N. D. Albertsen. Apr 75, 27p Rept no. CEL-TN-1364
See also report dated Jun 73, AD-764 054.

Descriptors: *Underwater structures, *Reinforced concrete, Spheres, Hydrostatic pressure, Reinforcing materials, Steel, Cracks, Failure(Mechanics).
Identifiers: *Implosions.

Four reinforced and two unreinforced concrete spheres of 32.00-inch outside diameter (OD) and 2.71-inch wall thickness (t) were tested under hydrostatic loading to determine the effect of embedded steel reinforcement on structural behavior. Test results show that the reinforced spheres (0.44 or 1.10% steel by area) failed by implosion at values for the ratio of implosion pressure to concrete strength that were on the average 5% lower than for the unreinforced spheres of the same size. In addition, the reinforced spheres developed cracks in-the-plane-of-the-wall at the inner surface of the reinforcement cage prior to implosion. Implosion results for the unreinforced spheres are 10% lower than predicted by an empirical equation developed from previous tests of unreinforced 16-inch OD spheres. These results provide initial insight into the behavior of hydrostatically loaded steel bar reinforced concrete spheres and indicate that additional test data is required before definitive design guides can be developed.

AD-A011 822/4GA PC$3.75/MF$2.25
Naval Ship Research and Development Center Annapolis Md Propulsion and Auxiliary Systems Dept
A Proposed System Effectiveness Evaluation Method for New or Existing Shipboard Systems,
Peter A. Siriano, Jr. Jul 75, 28p Rept no. PAS-74-62

Descriptors: *Shipbuilding, *Management, Systems analysis, Reliability, Maintainability, Decision making, Mathematical models.
Identifiers: *Project management.

This report describes a proposed simple, yet effective, method of evaluating the cost effectiveness and dependability of virtually any type of mechanical, electrical, or electronic system currently used (or proposed) in the U.S. Navy. Properly used, it also provides a management tool to be used by project managers in determining cost versus efficiency tradeoffs - before committing large sums of money. This methodology uses easily computerized mathematics and readily available operating data.

AD-A012 077/4GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
The 'Vikhr' Hydrofoil (Morskoi Teplokhod na Podvodnykh Krylyakh 'Vikhr'),
I. I. Erlykin. 22 May 75, 9p Rept no. NISC-Trans-3672
Trans. of Sudostroenie (USSR) n2 p1-6 1970.

Descriptors: *Hydrofoils, Ship hulls, Ship decks, Propellers(Marine), Marine engineering, Translations, USSR.
Identifiers: Vikhr vessel.

The brief article discusses the structural configuration, operational characteristics, and passenger capacity of the Russian hydrofoil called Vikhr.

AD-A012 078/2GA PC$4.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
Shipbuilding and Marine Structures (Obshchii Prodolnyi Izgib Korpusa Sudna s Parnymi Lyukami),
V. A. Stepanov. 20 May 75, 58p Rept no. NISC-Trans-3671
Trans. of Sudostroenie i Morskie Sooruzheniya (USSR) n17 p3-9, 17-36, 64-74 1971.

Descriptors: *Shipbuilding, *Marine engineering, Ship hulls, Bending stress, Hatches, Cargo ships, Mathematical models, Bulkheads, Corrugating, Beams(Structural), Flanges, Rigidity, Rods, Stability, Structural members, Computer aided design, Weight, Translations, USSR.
Identifiers: Ship design, River vessels.

Discussions are presented of overall longitudinal bending in the hull of a ship with twin hatches, the bending strength of corrugated bulkheads and beams with inclined flanges, and computer aided design of river vessels.

AD-A012 080/8GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
The 'Sormovich' Experimental Air Cushion Vehicle (Opytnoe Sudno na Vozdushnoi Podushke 'Sormovich',
A. Zhivotovskii, V. Shenberg, and A. Minchenya. 28 May 75, 7p Rept no. NISC-Trans-3677
Trans. of Rechnoi Transport (USSR) n3 p53-54 1973.

Descriptors: *Air cushion vehicles, *Passenger vehicles, Experimental design, Amphibious vehicles, Performance tests, Stability, Maneuverability, Rudders, Propellers(Aerial), Translations, USSR.
Identifiers: Sormovich air cushion vehicle.

The subject experimental air cushion passenger vehicle is an amphibious craft with a nozzle system for forming the air cushion, a flexible skirt, and location of the engine room, fan, and air propellers in the stern, and delivery of power to all users from a single engine through a system of gears and shafts.

AD-A012 221/8GA PC$3.75/MF$2.25
Transportation Systems Center Cambridge Mass
Maritime Dynamic Traffic Generator. Volume I: Summary Documentation.
Final rept. Jan 72-Jun 73,
Franklin D. MacKenzie. Jun 75, 37p Rept nos. TSC-OST-74-29.I, TSC-USCG-74-7-I USCG-D-37.75-I
See also Volume 2, AD-A012 222.

Descriptors: *Marine transportation, *Surface navigation, *Satellite communications, Merchant vessels, Global communication systems, Communications networks, Position finding, Data processing, Casualties.
Identifiers: DOT/4IZ/ID, DOT/4DZ/DD.

To determine the number of maritime vessels which are potential users of a satellite communications service and the required satellite coverage to provide this service, the weekly movements of 18,000 merchant vessels were recorded for the year 1972. The method of recording and the applications of the dynamic traffic generator is described in Volume 1: Summary Documentation. The processor program is designed to move these vessels along standard routes to their destination and keep statistical records of the ports visited, the five degree squares passed through and the occurence of casualties. Volume 2: Electronic Data Processing Program describes this processor. One of the most useful forms of the data output is a weekly plot, on a world map, of the average, daily vessel density per five degree square. This output is applicable to many related programs in the maritime area and is the subject of Volume 3: Density Data on World Maps.

AD-A012 338/0GA PC$3.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Central Instrumentation Dept
Structural Design Concept of TAP-1 Hydrofoil.
Final rept.,
Albert P. Clark. Apr 75, 24p Rept no. CID-29-48

Descriptors: *Hydrofoils, *Struts, Stress analysis, Structural properties, Structural steel, Criticality, Stresses, Loads(Forces), Structural response, Weight.
Identifiers: Design, Structural design, Supercavitating hydrofoils, Steel HY-130, Steel 17-4 PH.

A structural design concept of the TAP-1 foil and strut configuration was evolved and simplified stress analyses were performed in selected critical stress locations. Although conclusive determination of feasibility and establishment of ultimate criteria for optimum structural design and weight definition must await more sophisticated structural analyses, this preliminary study indicates that it will be feasible to ultimately produce a structurally adequate design capable of withstanding anticipated maximum load conditions. (Author)

AD-A012 364/6GA PC$3.25/MF$2.25
Iowa Inst of Hydraulic Research Iowa City
Further Investigations on Components of Ship Resistance.
Final rept. Oct 73-Oct 74,
L. Landweber. Mar 75, 12p Rept no. IIHR-173
Contract N00014-68-A-0196-00010
See also report dated May 74, AD-784 207.

Descriptors: *Ship hulls, *Hydrodynamics, *Drag, Resistance, Viscous flow, Wake, Mathematical models, Formulas(Mathematics), Velocity, Ocean waves, Interactions, Test methods, Water channel test facilities, Towing, Blocking, Hydromechanics.
Identifiers: Wave resistance.

The accomplishments during the eleventh year of research on components of ship resistance, supplementing that reported in IIHR Report No. 162 on the first 10 years, are summarized. These include the derivation of a more exact formula for calculating the viscous drag of a ship model from wake-survey measurements, a refinement of a procedure for determining wave resistance from surface-profile measurements, studies of the effect of the wake on wave-resistance measurements, and some contributions to the problem of correcting resistance measurements for the influence of tank boundaries.

AD-A012 412/3GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Harmonic Motion of Cylinders in Uniform Flow.
Master's thesis,
James Thomas Fry. Jun 75, 53p

Descriptors: *Cylinders, *Fluid flow, *Vibration, Oscillation, Cables, Mooring, Computer programs, Theses.
Identifiers: *Cable strumming.

The time-dependent force acting on a cylinder undergoing harmonic in-line oscillations in an otherwise steady flow was measured for various amplitudes and frequencies of oscillation and mean flow velocity. The experiments were carried out in a recirculating water tunnel operating as an open channel with a free surface at the test section. The time-dependent force has been expressed in terms of a mean drag coefficient and the Fourier-averaged drag and inertia coefficients and as functions of the relative amplitude and a frequency paramter.

AD-A012 418/0GA PC$6.25/MF$2.25
Naval Postgraduate School Monterey Calif
A Simulation of a Computer Graphics-Aided Aircraft Handling System.
Master's thesis,
Alan Keith Johnson, and Kriston Philip Woolley. Jun 75, 151p

Descriptors: *Aircraft carriers, *Aircraft, *Handling, Hangar decks, Flight decks, Decision making, Computer graphics, Computer programs, Computerized simulation, Theses, Maintenance personnel.

Previous studies and research have determined that the aircraft handling problem aboard our modern aircraft carriers is needlessly complicated by inadequate communication and information handling. This study develops an interactive computer graphics system which would improve information handling. The proposed system will not make the logical decisions of the handling problem, but rather will assist handling and maintenance personnel in the presentation and exchange of aircraft information. The study includes a discussion of previous efforts in this area, a basic description of interactive computer graphics and presently available hardware, a description of the entire proposed system to be implemented onboard the carrier, and a computer graphics program that realistically simulates the workings of the displays proposed in the above mentioned system.

COM-75-10772/2GA PC$9.50/MF$2.25
Nathan (Robert R.), Associates, Inc., Washington, D.C.
The Coastal Plains Deepwater Terminal Study. Volume I. Executive Summary Study Report.
Jan 75, 344p*
Prepared in cooperation with Coastal Zone Resources Corp., Wilmington, N.C. Sponsored in part by Coastal Plains Regional Commission, Washington, D.C. Executive summary separately inserted. See also Volume 2, COM-75-10773. Paper copy also available in set of 2 reports as COM-75-10771-SET, PC$18.00.

Descriptors: *Atlantic coast ports, *Deepwater terminals, Coastal zone use, Coastal zone planning, Coastal resources management, Economic analysis, Petroleum industry, Petrochemistry, Economic impacts, Coastal plains, Oil spills, Site surveys, North Carolina, South Carolina, Georgia, Environmental impacts.
Identifiers: *Deepwater ports.

The report examines factors affecting feasibility of locating refineries, petrochemicals and auxiliary deepwater terminals in the Coastal Plains Region of North Carolina, South Carolina and Georgia and identify siting criteria. Analysis of economic and environmental factors is the primary objective of this analysis. Analysis includes investment facilities description, economic impact analysis, public revenue and expenditure implications, and environmental analysis.

COM-75-10773/0GA PC$9.25/MF$2.25
Nathan (Robert R.), Associates, Inc., Washington, D.C.
The Coastal Plains Deepwater Terminal Study. Volume II. Technical Appendixes.
Jan 75, 320p*
Prepared in cooperation with Coastal Zone Resources Corp., Wilmington, N.C. Sponsored in part by Coastal Plains Regional Commission, Washington, D.C. See also Volume 1, COM-75-10772. Paper copy also available in set of 2 reports as COM-75-10771-SET, PC$18.00.

Descriptors: *Atlantic coast ports, *Deepwater terminals, Environmental impacts, Coastal zone use, Coastal zone planning, Coastal resource management, Economic analysis, Petroleum industry, Petrochemistry, Economic impacts, Coastal plains, Oil spills, Site surveys, North Carolina, South Carolina, Georgia.

The report examines factors affecting feasibility of locating refineries, petrochemicals and auxiliary deepwater terminals in the Coastal Plains Region of North Carolina, South Carolina and Georgia and identify siting criteria. Analysis of economic and environmental factors is the primary objective of this analysis. Topics discussed in this volume include the following: Institutional and policy considerations; Detailed engineering analysis; Economic impact analysis; Demand analysis; Description of computer cost model.

COM-75-10923/1GA PC$4.75/MF$2.25
Todd Shipyards Corp., Seattle, Wash. Seattle Div.
Use of Scale Models as a Management Tool.
Final rept.,
Lou Chirillo. May 74, 76p* MA-RD-930-75075
Contract MA-2-36233
Report on the National Shipbuilding Research Program.

Descriptors: *Shipbuilding, *Ship models, *Management information systems, Design improvements, Decision making, Communications management, Specialized training, Marketing aids, Classifications, Benefit cost analysis, Methodology, Technological advancement, Scale(Ratio).
Identifiers: Scale models.

This report investigates uses and develops cost data and techniques relative to the productive use of scale models in shipbuilding. The major topics covered by this report are, model types, benefits, costs, and model building methods.

COM-75-10932/2GA PC$4.25/MF$2.25
Todd Shipyards Corp., Seattle, Wash. Seattle Div.
Cost Effectiveness Study of Weather Protection for Shipbuilding Operations. Volume 1.
Final rept.,
Lou Chirillo. Apr 74, 75p* MA-RD-930-75074-Vol-1
Contract MA-2-36233
See also Volume 2, COM-75-10933.
Paper copy also available in set of 2 reports as COM-75-10931-SET, PC413.00.

Descriptors: *Shipbuilding, *Shipyards, *Weather, *Protection, Cost effectiveness, Exposure, Weatherproofing, Protective coverings, Shelters, Benefit cost analysis, Japan, Europe, United States.
Identifiers: *Weather protection, *Hoarding panels.

This report contains data on how weather factors impact adversely on the ship-building process. It is comprehensive, not intended for the casual reader, and useful for the purpose of quantifying losses due to weather. It can serve management to determine how much money should be invested in weather protection devices.

COM-75-10933/0GA PC$8.75/MF$2.25
Todd Shipyards Corp., Seattle, Wash. Seattle Div.
Cost Effectiveness Study of Weather Protection for Shipbuilding Operations. Volume II.
Final rept.,
Lou Chirillo. Apr 74, 254p* MA-RD-930-75074-Vol-2
Contract MA-2-36233
See also Volume 1, COM-75-10932.
Paper copy also available in set of 2 reports as COM-10931-SET, PC$13.00.

Descriptors: *Shipbuilding, *Shipyards, *Weather, *Protection, Cost effectiveness, Exposure, Weatherproofing, Protective coverings, Shelters, Benefit cost analysis, Japan, Europe, United States.

This report contains data on how weather factors impact adversely on the ship-building process. It is comprehensive, not intended for the casual reader, and useful for the purpose of quantifying losses due to weather. It can serve management to determine how much money should be invested in weather protection devices.

N75-23810/5GA PC$3.75/MF$2.25
Nederlands Scheeps-Studiecentrum TNO, Delft. Scheepsbouw Afdeling.
Wave Induced Motions and Loads on Ships in Oblique Waves.
R. Wahab, and J. H. Vink. May 75, 40p REPT-193-S, TDCK-65496

Descriptors: *Motion, *Oblique coordinates, *Ships, *Water waves, Equations of motion, Hydrodynamic equations, Loads (Forces), Sea water, Ship hulls.

For abstract, see STAR 1315

13K. Pumps, Filters, Pipes, Fittings, Tubing and Valves

AD-A012 185/5GA PC$3.25/MF$2.25
Polytechnic Inst of New York Farmingdale
Narrowband Ultraviolet Vapor Filter,
Benjamin Senitzky . 2 Jan 74, 8p AFOSR-TR-75-0904
Grant AF-AFOSR-2568-73
Availability: Pub. in Applied Optics, V14 n1 p238-244 Jan 75.

Descriptors: *Gas filters, Vapors, Mercury, Narrowband, Ultraviolet spectra, Spectrum analyzers, Atoms, Excitation, Pressure, Microphotography, Specular reflection, Reprints.

A narrowband optical vapor filter based on the principle of selective specular reflection from vapors is described. The device consists of a mercury vapor cell with Brewster angle windows that selectively reflects the 2537-angstroms line and transmits other radiation. The bandwidth of the device varies from 0.1 Angstroms to 1.0 Angstroms as a function of the mercury vapor pressure. Its signal-to-skirt rejection ratio at an acceptance angle of 7 deg is 28 dB, and its acceptance area is 1 sq cm. It is used to perform a spectrochemical analysis of mercury in water and also to take a monochromatic photograph of the spatial distribution of excited mercury atoms in a flame. (Author)

AD-A012 235/8GA PC$4.25/MF$2.25
Honeywell Inc Minneapolis Minn Government and Aeronautical Products Div
Hydrofluidic Servovalve Development.
Final rept. Dec 73-Dec 74,
Holger C. Kent. Jun 75, 58p Rept no. W0565-FR USAAMRDL-TR-75-21
Contract DAAJ02-74-C-0015

Descriptors: *Hydraulic servomechanisms, *Servovalves, Fluidic control, Valves, Fluid flow, Structural members, Specifications.
Identifiers: *Poppet valves.

This report covers the analysis, detail design, fabrication, and evaluation of a poppet-type servovalve to be used in servoactuators for hydrofluidic stability augmentation systems. Initial analysis and design included review of poppet valve principles, various design configurations and preliminary tests of poppet valve operation and flow forces. Evaluation included static, dynamic, and limited environmental tests. Although servovalve performance requirements were not met, it was shown that poppet valving can be mechanized to operate as a servovalve in driving an actuator piston.

N75-23880/8GA PC$5.75
TRW Systems Group, Redondo Beach, Calif. Materials Science Staff.
Ames Heat Pipe Experiment (Ahpe) Experiment Description Document.
B. D. Marcus. Jan 72, 133p NASA-CR-114413, TRW-13111-6033-R0-00
Contract NAS2-5503

Descriptors: *Heat pipes, *Vacuum tests, Conductive heat transfer, Design analysis, Load tests, Oao 3, Performance tests, Temperature control.

For abstract, see STAR 1315

13L. Safety Engineering

COM-75-10921/5GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Center for Fire Research.
Development of a Fire Test Method for Flexible Connectors in Air Distribution Systems.
Final rept.,
Lionel A. Issen. Apr 75, 33p NBSIR-75-673

Descriptors: *Heating equipment, *Air conditioning equipment, *Ventilators, *Flexible couplings, *Fire resistance, Fire tests, Ducts, Glass fibers, Aluminum, Steels.

The report describes fire tests on four flexible connectors of the type used in air conditioning systems. Four flexible connectors (aluminum, felted glass fiber, steel, and woven glass fiber) were exposed to a standard ASTM E-119 fire test. The results were in agreement with previous results in which a different sized branch duct was used in the assemblies. The results indicated a need to control furnace pressures. The test results were used to develop a proposed test method for fire testing flexible connectors. This proposed test method is described in the report.

COM-75-10922/3GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Programmatic Center for Fire Research.
Relationship of Garment Characteristics and Other Variables to Fire Injury Severity.
Final rept.,
Laura B. Buchbinder. Jun 75, 46p* NBS-TN-867
Prepared in cooperation with The Cotton Foundation, Memphis, Tenn. Library of Congress Catalog Card no. 75-600026.

Descriptors: *Apparel fabrics, *Fires, *Burns(Injuries), Accidents, Age, Flammable liquids, Ignition, Synthetic fibers, Accident prevention, Fire safety, Children.
Identifiers: Elderly persons.

Interactions between accident variables are summarized and recommendations for remedial action and further research are included. Garments involved in apparel fire accidents were classified by degree of fit and amount of the body covered. Degree of fit could not be shown to be directly related to injury severity. Within garment configuration classifications, age was shown to be a major determinant of injury severity, with victims over 65 years of age receiving a significantly higher percentage of severe burns than those in the 21-65 age group. In addition, when accidents involved flammable liquids, (1) the fabrics involved tended to be heavier, (2) the fit of the garment at point of ignition was closer, and (3) the proportion of cellulosic/synthetic blend and 100% synthetic fabrics was higher than in accidents which did not involve flammable liquids.

PB-242 281/4GA PC$3.75/MF$2.25
Notre Dame Univ., Ind. Dept. of Aerospace and Mechanical Engineering.
Fire and Smoke Spread in a Corridor: The Pre-Heat Period, 2-D Parabolic Flows.
Technical rept.,
Michael L. Doria. 15 Feb 74, 42p TR-37191-74-3 NSF/RA/E-74-065
Grant NSF-GI-37191

Descriptors: *Fires, *Smoke, *Gas dynamics, Mathematical models, Numerical analysis, Equations of motion, Two dimensional flow, Unsteady flow, Mathematical prediction, Temperature, Velocity.
Identifiers: *Corridor fires, Fire research.

In this report on corridor fires a numerical model is developed for the prediction of two dimensional unsteady buoyancy driven flows. The motion is assumed to be parabolic in the downstream coordinate. The model incorporates the balance equations of mass, momentum, and energy together with the equation of state of a perfect gas. Physical variables, velocity and pressure, are used rather than stream function-vorticity variables. The model allows for non-uniform transport coefficients, turbulence, and one dimensional radiative transport. The numerical model is capable of predicting temperature and velocity profiles for the pre-heat period in a corridor provided there is strong enough through flow so that no recirculation occurs.

PB-242 430/7GA PC$3.75/MF$2.25
National Transportation Safety Board, Washington, D.C. Bureau of Surface Transportation Safety.
Collision of Penn Central Freight Train OV-8 with an Open Drawbridge, Cleveland, Ohio, May 8, 1974.
Railroad accident rept.
26 Mar 75, 33p NTSB-RAR-75-3, SS-R-29

Descriptors: *Railroads, *Accident investigations, Collision research, Drawbridges, Operators(Personnel), Decision making, Safety, Traffic signals.
Identifiers: *Railroad accidents, DOT/5A, DOT/4DZ/DC.

On May 8, 1974, Penn Central freight train OV-8 collided with the counterweight of a lift-span drawbridge on the Cuyahoga River at Cleveland, Ohio. Shortly before the collision, the eastbound train had been traveling at 33 mph on a main track equipped with automatic block signals when the DB operator contacted the traincrew and advised them that the route was clear ahead. Then, the operator remembered that a boat had been awaiting passage and, without informing the traincrew, he opened the bridge. The train passed the red home signal of the DB interlocking without braking and struck the counterweight of the open bridge about 600 feet beyond the signal. The two crewmembers in the lead locomotive unit died as a result of crash injuries. The National Transportation Safety Board determines that the probable cause of this accident was the failure of the locomotive crewmembers to obey a wayside signal indication to stop and the concurrent opening of the drawbridge by the DB operator after he had advised the oncoming traincrew by radio that the route was clear.

PB-242 464/6GA PC$5.75/MF$2.25
Opinion Research Corp., Princeton, N.J.
Safety Belt Interlock System: Usage Survey.
Final rept. Nov 73-Mar 75,
Albert Westefeld, and Benjamin M. Phillips. May 75, 141p 51183 DOT-HS-801 594
Contract DOT-HS-4-00805

Descriptors: *Passenger vehicles, *Safety belts, Utilization, Locking, Fasteners, Logic circuits, Warning systems, Safety engineering, Statistical data, Motor vehicle operators, Attitudes, Public opinion, Accident prevention.
Identifiers: DOT/5A, DOT/4DZ/DB, *Safety belt interlock systems.

The research is intended to measure the effectiveness of the interlock system in increasing safety belt usage. Three separate studies were conducted: (a) Among rental car customers at U.S. airports (to obtain a large body of data early in the 1974 model year); (b) among rental car customers at Toronto International Airport, where different types of use-inducing systems could be studied; and (c) among owners of private cars in the general population of vehicles. Study (a) was conducted at Miami, Chicago, and Los Angeles. Customers returning 1974 model rental cars at these airports were observed for their safety belt usage, and a subsample of nonusers immediately interviewed to determine the circumstances and attitudes surrounding their nonusage. Similar methods of observing and interviewing were followed at Toronto.

PB-242 758/1GA PC$3.25/MF$2.25
Consumer Product Safety Commission, Washington, D.C.
Reports Required by the Flammable Fabrics Act, Fiscal Year 1973.
Annual rept. no. 5.
1973, 17p
See also PB-242 759.

Descriptors: *Flammability, *Fabrics, *Accident investigations, Ignition, Clothing, Accidents, Fires, Textiles, Regulations, Research, Consumer products, Product safety, Standards.

The report summarizes Consumer Product Safety Commission and National Bureau of Standards investigations into accidents attributed to flammable fabrics. A detailed analysis is provided on persons to whom fabric ignition accident occur; how, when, and where such accidents occur; and what fabric items are involved. Flammable fabric regulations and research activities are described.

PB-242 759/9GA PC$3.25/MF$2.25
Consumer Product Safety Commission, Washington, D.C.
Reports Required by the Flammable Fabrics Act, Fiscal Year 1974.
Annual rept. no. 6.
1974, 22p
See also PB-242 758.

Descriptors: *Flammability, *Fabrics, *Accident investigations, Ignition, Clothing, Accidents, Fires, Textiles, Regulations, Research, Consumer products, Product safety, Standards.

The report summarizes Consumer Product Safety Commission and National Bureau of

Standards investigations into accidents attributed to flammable fabrics. A detailed analysis is provided on persons to whom fabric ignition accident occur; how, when, and where such accidents occur; and what fabric items are involved. Flammable fabric regulations and research activities are described.

PB-242 794/6GA PC$7.25/MF$2.25
Food and Drug Administration, Bethesda, Md. Bureau of Product Safety.
Flamable Fabrics: Studies of Deaths, Injuries, and Economic Losses Resulting from Accidental Burning of Products, Fabrics, or Related Materials, Fiscal Year 1972.
Annual rept. no. 4.
1973, 214p
See also PB-221 852.
Paper copy also available from GPO.

Descriptors: *Flammability, *Fabrics, *Accident investigations, Ignition, Clothing, Fires, Accidents, Textiles, Burns(Injuries), Regulations, Standards, Research, Consumer products, Product safety, Flammable liquids, Electric stoves.

The report summarizes Bureau of Product Safety investigations into accidents attributed to flammable fabrics. A detailed analysis is provided of persons to whom fabric ignition accidents occur; when, where, and how such accidents occur; and what fabric items are involved. Flammable fabrics accidents are related to the use of matches and smoking materials, electric stoves, and flammable liquids.

PB-242 795/3GA PC$4.25/MF$2.25
Food and Drug Administration, Bethesda, Md. Bureau of Product Safety.
Studies of Death, Injuries, and Economic Losses Resulting from Accidental Burning of Products, Fabrics or Related Materials.
Annual rept. no. 1.
1969, 61p
See also PB-221 852.

Descriptors: *Flammability, *Fabrics, *Accident investigations, Ignition, Clothing, Textiles, Accidents, Fires, Burns(Injuries), Research, Standards, Consumer products, Product safety.

The report summarizes Bureau of Product Safety investigations into accidents associated with flammable fabrics. A detailed analysis is provided of the number of injuries and deaths, the types of garments and fabrics, the seriousness of the injuries and the economic losses associated with flammable fabric accidents. Recommendations were made for fabric flammability standards.

PB-242 796/1GA PC$3.75/MF$2.25
Food and Drug Administration, Bethesda, Md. Bureau of Product Safety.
Flammable Fabrics: Studies of Deaths, Injuries and Economic Losses Resulting from Accidental Burning of Products, Fabrics or Related Materials Through June 1970.
Annual rept. no. 2.
4 Mar 71, 39p
See also PB-242 794.

Descriptors: *Flammability, *Fabrics, *Accident investigations, Ignition, Clothing, Textiles, Fires, Accidents, Regulations, Standards, Research, Consumer products, Product safety.

The report summarizes Bureau of Product Safety investigations and activities relating to flammable fabrics. Included in the study are the numbers of flammable fabric accidents, the seriousness of accidents, sources of ignition, places where accidents occur, and types of garments and fabrics involved. National Bureau of Standards testing of fabric samples are reported.

13M. Structural Engineering

AD-A011 942/0GA PC$7.25/MF$2.25
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Civil Engineering
SINGER: A Computer Code for General Analysis of Two-Dimensional Reinforced Concrete Structures. Volume 1. Solution Process.
Final rept. Aug 72-Aug 74,
S. M. Holzer, R. J. Melosh, R. M. Barker, and A. E. Somers. May 75, 210p AFWL-TR-74-228-Vol-1
Contract F29601-73-C-0022
See also Volume 3, AD-A011 585.

Descriptors: *Structures, *Reinforced concrete, *Blast loads, Joints, Beams(Structural), Stresses, Strain(Mechanics), Finite element analysis, Nonlinear systems, Computerized simulation, Mathematical models, Computer programming, User needs, FORTRAN.
Identifiers: Static structural analysis, Dynamic structural analysis, SINGER computer program.

This report describes the mathematical model and the solution process which form the basis of the computer program SINGER. The function of SINGER is to predict the behavior of plane skeletal reinforced concrete structures in their environments. Of primary interest is the transient nonlinear response including element failures and structural collapse. The structure is represented by a discrete model composed of line elements (models of partial joint releases). The line elements admit geometric and physical nonlinearities; they can predict the behavior of reinforced concrete members subject to axial and flexural distortions up to failure. The state of the element is characterized by its internal energy.

AD-A012 112/9GA PC$3.75/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
1973 Performance Survey of Dew Line Ice Cap Stations Dye-2 and Dye-3.
Special rept.,
Wayne Tobiasson, Gary Hine, Robert Redfield, and Wallace Blanchard. May 74, 42p Rept no. CRREL-SR-228
See also report dated Apr 74, AD-780 051.

Descriptors: *Radar stations, *Construction, *Foundations(Structures), *Cold regions, Engineering, Structural properties, Loads(Forces), Stresses, Greenland, Snow, Depth, Ice caps, Frames, Structures, Subsurface, Waste disposal, Waste water.
Identifiers: *Cold weather construction, Dew line.

The report summarizes the findings of the 1973 performance survey conducted by the authors at DYE-2 and DYE-3 from 4 June to 11 July 1973. Field work at each site consisted of elevation surveys of building components (footings, truss collars, truss enclosure, and underside of elevated structure); the POL system (tanks, shafts, and tunnels); and the wastewater disposal system (tunnels, pits, and vents); along with the surrounding snow surface. Temperatures were measured in the surrounding snow, truss enclosure, POL tunnels and sewer tunnels. At each site a comprehensive visual inspection was made of the composite building and its appurtenances.

AD-A012 117/8GA PC$3.75/MF$2.25
Cold Regions Research and Engineering Lab Hanover N H
Detecting Structural Heat Losses with Mobile Infrared Thermography. Part II - Survey of Pease Air Force Base, Portsmouth, New Hampshire.
Research rept.,
R. H. Munis, R. H. Berger, S. J. Marshall, and M. A. Bush. Jun 75, 33p Rept no. CRREL-RR-338
See also report dated Oct 74, AD-A001 549.

Descriptors: *Buildings, *Insulation, *Heat loss, *Infrared detection, *Thermography, Infrared photography, Surface temperature, Thermographs, Mobile, Field tests, New Hampshire.
Identifiers: Pease Air Force Base.

During the winter of 1973-74 a mobile infrared thermography system was used to survey housing units and base facilities at Pease Air Force Base, Portsmouth, New Hampshire. This report provides both qualitative and quantitative evidence regarding heat flow out of the eave vents of these housing units. Calculations indicate that a significant amount of heat is being lost in this manner due to inadequate attic (cap) insulation. Possible evidence of incomplete ventilation could explain the presence of condensation in the housing units. Analyses of thermograms are presented to show the possible existence of low and high pressure areas around a structure and how they relate to heat loss.

AD-A012 211/9GA PC$11.25/MF$2.25
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Civil Engineering
SINGER: A Computer Code for General Analysis of Two-Dimensional Concrete Structures. Volume II. Program Document.
Final rept. Aug 72-Aug 74,
R. M. Barker, R. J. Melosh, and S. M. Holzer. May 75, 430p Rept no. AFWL-TR-74-228-V2 AFWL-TR-74-228-Vol-2
Contract F29601-73-C-0022
See also Volume 1, AD-A011 942 and Volume 3, AD-A011 585.

Descriptors: *Structural members, *Reinforced concrete, *Loads(Forces), *Computer programs, Subroutines, Stresses, Computations, Finite element analysis.
Identifiers: SINGER computer program, Static structural analysis, Dynamic structural analysis.

This report provides program documentation for the SINGER computer code. It includes a general description of analysis flow, writeups and flowcharts of the individual routines, instructions for modifying the program capacity, error messages, and a complete listing of the code. When activated, the SINGER program predicts the transient response of two-dimensional reinforced concrete frames subjected to time varying loadings including the effects of nonlinear material and large geometry changes.

NTIS/PS-75/571/0GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Industrialized Housing (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Guy E. Habercom, Jr., and Gerald H. Adams. Jul 75, 188p*
Supersedes COM-74-10982.

Descriptors: *Bibliographies, *Residential buildings, *Prefabricated housing, Residential construction, Industrialization, Mobile homes, Houses, Fire resistance, Acoustic properties, Construction materials, Technology innovation, Structural characteristics, Construction industry, Benefit cost analysis, Consumer preferences, Environmental aspects, Dynamic loads, Weathering, Building codes, Project planning, Habitability, Plumbing, Low income housing.
Identifiers: Breakthrough operation, Industrialized housing, Subfloors, Fire endurance tests.

These abstracts are relevant to construction materials, environment testing, costs, and construction guidelines for industrialized building. Much of the research was generated by the Department of Housing and Urban Development (HUD) in its Breakthrough Operation. Prefabri-

cation techniques employed by numerous foreign countries are reviewed. (Contains 183 abstracts).

PB-242 434/9GA PC$6.25/MF$2.25
California Univ., Berkeley. Earthquake Engineering Research Center.
Static and Dynamic Analysis of Nonlinear Structures,
Digambar P. Mondkar, and Graham H. Powell.
11 Jun 75, 168p EERC-75-10
Grant NSF-GI-36387

Descriptors: *Structures, Nonlinear systems, Dynamic structural analysis, Static structural analysis, Equations of motion, Dynamic response, Plastic properties, Computer programming.
Identifiers: *Earthquake engineering, Finite element analysis.

This report presents the theoretical and computational procedures which have been applied in the design of a general purpose nonlinear computer code for static and dynamic analysis of nonlinear structures. Using the principle of virtual displacements, incremental equations of motion for structures undergoing large displacements and strains are first derived, using the Lagrangian description of deformation. These equations of motion are then discretized using the finite element displacement formulation, and the element characteristics, including 'linear' and 'nonlinear' stiffness matrices, are derived for the particular case of a two dimensional isoparametric finite element. Physical nonlinearity due to material behavior is introduced for elasto-plastic materials, and the constitutive laws for commonly used elasto-plastic models are described.

PB-242 482/8GA PC$3.25/MF$2.25
Sydney Univ. (Australia). Civil Engineering Labs.
The Behaviour of Uniformly Loaded Piled Strip Footings.
Research rept.,
P. T. Brown, and T. J. Wiesner. Jan 75, 22p R-258

Descriptors: *Pile structures, *Loads(Forces), Footings, Bending moments, Displacement, Australia.

Graphical results are presented for load taken by piles, maximum displacement and differential displacement, and maximum positive and negative bending moments, due to uniformly distributed loading applied to a smooth strip footing which is supported by piles and a very deep homogeneous isotropic elastic foundation. The results presented are for piles whose length/diameter ratio is 50, footings whose width is 5 pile diameters and an incompressible foundation. Corrections for other pile length/diameter ratios, other footing widths and soil Poisson's ratio of zero, are discussed.

14. METHODS AND EQUIPMENT

14B. Laboratories, Test Facilities, and Test Equipment

AD-A011 693/9GA PC$4.75/MF$2.25
Block Engineering Inc Cambridge Mass
Phoenix Interferometer.
Final technical rept. Dec 73-Jan 75,
Paul G. J. Morse. Jun 75, 77p AFAL-TR-75-94
Contract F33615-74-C-1074, ARPA Order-2116

Descriptors: *Interferometers, *Infrared spectrometers, Intermediate infrared radiation, High resolution, Airborne, Performance(Engineering), Engineering drawings, Plumes.
Identifiers: Design, Fourier transform spectroscopy, Firebird system.

The primary objective of the program was to provide a short wavelength spectroscopic capability to the Firebird system. The extension to shorter wavelengths permits acquisition of high resolution data in the important 2.7 and 4.2 micrometer regions. This information is considered essential for the development of plume radiation models and the unambiguous identification of specific excitation mechanisms in the SWIR spectral region. The spectrometer to be built for this program was to use a rapid scanning, high spectral resolution Michelson interferometer operating at high altitude ambient temperatures, around 220K. The sensor was to have a spectral range of 2 - 5.5 micrometers and a field of view of 5.6 milliradians which could be pointed at or held on airborne targets by means of the Firebird stabilized tracking system. The interferometer spectrometer was designed, developed, and fabricated.

AD-A011 721/8GA PC$3.75/MF$2.25
Pratt and Whitney Aircraft East Hartford Conn
X-Ray Wear Metal Monitor.
Final rept. 1 May-1 Nov 74,
John R. Miner, and Leonard L. Packer. Jan 75, 31p Rept no. PWA-5224 AFAPL-TR-75-6
Contract F33615-74-C-2024

Descriptors: *Monitors, Wear, Gas turbines, X rays, Fluorescence, Lubricating oils, Monitoring, Metal detectors, Feasibility studies, Iron.
Identifiers: *X ray fluorescence.

The feasibility of using a X-ray fluorescence wear metal monitor to continuously monitor iron concentration levels in the lubrication system of an operating gas turbine engine was demonstrated. The X-ray wear metal monitor maintained oil seal integrity under the temperature and pressure environment of both laboratory simulated and actual engine operating conditions. The monitor also demonstrated the ability to make significant measurements of the iron concentration level in flowing MIL-L-7808 oil, under both laboratory and engine conditions, within a standard deviation of plus or minus three parts per million. This sensitivity is consistent with experience from the Spectrometric Oil Analysis Program.

AD-A011 914/9GA PC$3.25/MF$2.25
Illinois Univ At Urbana-Champaign Dept of Physics
Hydrogen in Metals and on Metal Surfaces.
Final rept. 1974-75,
C. P. Flynn. May 75, 8p
Contract N00014-67-A-0305-0027

Descriptors: *Test equipment, *Magnetooptics, Impurities, Hydrogen, Faraday effect, Optical properties, Absorption(Physical), Computer applications, Polarization, Vacuum ultraviolet radiation, Nondestructive testing, Surface properties.

The report briefly describes a magnetooptic apparatus, and an apparatus for study of optical absorbate excitations.

AD-A011 931/3GA PC$4.25/MF$2.25
Utah State Univ Logan Space Science Lab
Design and Calibration of a Rocket-Borne Electron Spectrometer.
Scientific rept.,
Parris C. Neal. Dec 74, 69p Rept nos. HAES-8, Scientific-1 AFCRL-TR-74-0629
Contract F19628-74-C-0130

Descriptors: *Electron energy, *Aurorae, Experimental design, Calibration, Electron spectroscopy, Spectrometers, Rocketborne, Performance(Engineering), Resolution, Computer programs.
Identifiers: *Electron spectrometers.

An electron spectrometer was designed, calibrated and applied in an auroral research program to measure the electron energy spectra from 100 to 1500 ev. The approach included the practical application of theoretical mathematics to design and calibrate the instrument. Such design and calibration using a digital computer for fast analysis can be used in the creation of similar instruments.

AD-A011 947/9GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Performance of the ELF Antenna Water-Flow Tunnel.
Technical note,
Michael L. Burrows. 27 May 75, 55p Rept no. TN-1975-9 ESD-TR-75-172
Contract F19628-73-C-0002

Descriptors: *Hydraulic test units, *Submarine antennas, Test facilities, Towed bodies, Extremely low frequency, Performance.

A water-flow tunnel for testing submarine-towed ELF antennas has been built. A year's operating experience with it shows that it can rapidly provide valuable test data attainable otherwise only slowly on submarines. Its thick aluminum shielding creates, within the tunnel, the electromagnetically quiet undersea environment; the pipe turbulence of the flow excites the antenna cable essentially uniformly along its length, as does the boundary layer turbulence of a cable under tow; and, using a bias winding on the antenna, the axial magnetic bias field can be varied to simulate heading changes.

AD-A012 000/6GA PC$3.75/MF$2.25
Arnold Engineering Development Center Arnold Air Force Station Tenn
An Experimental Study of Several Wind Tunnel Wall Configurations Using Two V/STOL Model Configurations.
Final rept. 10 Mar 72-16 Apr 74,
T. W. Binion, Jr. Jul 75, 37p Rept no. AEDC-TR-75-36
Prepared in cooperation with ARO, Inc., Tullahoma, Tenn. Rept. no. ARO-PWT-TR-75-4. Sponsored in part by National Aeronautics and Space Administration, Moffett Field, Calif. Ames Research Center.

Descriptors: *Wind tunnel tests, *Wind tunnels, *Experimental design, Interference, Walls, Errors, Model tests, Vertical takeoff aircraft, Short takeoff aircraft, Jet flaps, Configurations.
Identifiers: *Wall interference.

Experiments were conducted in the low speed wind tunnel using two V/STOL models, a jet-flap and a jet-in-fuselage configuration, to search for a wind tunnel wall configuration to minimize wall interference on V/STOL models. Data were also obtained on the jet-flap model with a uniform slotted wall configuration to provide comparisons between theoretical and experimental wall interference. A test section configuration was found which provided some data in reasonable agreement with interference-free results over a wide range of momentum coefficients.

AD-A012 012/1GA PC$3.75/MF$2.25
Illinois Univ At Urbana-Champaign Savoy Aviation Research Lab
Effective and Economical Simulation in the Design and Use of Aero Systems.
Interim rept.,
Stanley N. Roscoe. Apr 75, 30p Rept no. ARL-75-8/AFOSR-75-3 AFOSR-TR-75-0869
Contract F44620-70-C-0105

Descriptors: *Flight simulators, *Air Force training, *Performance(Human), Performance(Engineering), Cost effectiveness, Human factors engineering, Transfer of training, Flight training, Visual signals, Measurement, Motion, Utilization, Training devices, Variations.

This paper is a lightly edited transcript of a 1975 talk presented at a conference on simulation of aero systems cosponsored by the Air Force Office of Scientific Research and the Air Force Flight Dynamics Laboratory. The characteristics of aircraft simulators leading to their effective and economical use are shown experimentally to differ as a function of their application, whether in engineering research, pilot performance assessment and prediction or training. Issues in the design and use of flight training simulators involve the effectiveness and economics of motion systems, visual systems, and performance measurement systems.

AD-A012 076/6GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
'Solenoid' Assembly for Obtaining Superstrong Magnetic Fields (Ustanovka 'Solenoid' dlya Polucheniya Sverkhsilnykh Magnitnykh Polei),
V. G. Veselago, L. P. Maksimov, and A. M. Prokhorov. 22 May 75, 9p Rept no. NISC-Trans-3673
Trans. of Akademiya Nauk SSSR. Vestnik, n12 p58-62 1968.

Descriptors: *Electric coils, Magnetic fields, Laboratory equipment, Water cooling, Translations, USSR.
Identifiers: High magnetic field research.

The 'Solenoid' assembly for obtaining superstrong d-c magnetic fields has been in operation in the P. N. Lebedev Institute of Physics for more than a year. Two methods are used to obtain superstrong d-c magnetic fields. The first consists in passing a strong current through a coil which is cooled by some kind of liquid, the liquid usually being water. This method requires large amounts of electrical energy. The second method, which is based on the use of a superconducting solenoid, is free of this shortcoming, as only small amounts of power are needed. However, the first method was selected.

AD-A012 201/0GA PC$4.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
Aerodynamic Calibration of the Aerospace Research Laboratories' M=6 High Reynolds Number Facility.
Final rept. Dec 73-Mar 74,
Anthony W. Fiore, and C. Herbert Law. Feb 75, 65p Rept no. ARL-75-0028

Descriptors: *Hypersonic wind tunnels, Air Force facilities, Hypersonic flow, Free stream, Mach number, Calibration, Reynolds number, Stagnation pressure, Stagnation temperature, Distribution.

This report describes the Aerospace Research Laboratories' Mach 6 high Reynolds number wind tunnel and its aerodynamic calibration. This facility operates at a Mach number of approximately 6 over a unit Reynolds number range of 10 sup 7 to 3 x 10 sup 7 per foot. The Unit Reynolds number is varied by changing the stagnation pressure from 700 through 2100 psia while the stagnation temperature is held constant at 100 deg. R. The aerodynamic calibration consisted of the determination of the actual free stream Mach number distribution, the free stream total temperature distribution, the flow angularity within the test core, and some insight into tunnel blockage conditions. The Mach number and total temperature distribution tests were conducted simultaneously and were carried out at three stagnation pressures of 700, 1400, and 2100 psia corresponding to unit Reynolds numbers of 9.76 x 10 sup 6, 18.77 x 10 sup 6, and 30.27 x 10 sup 6 per foot. The flow angularity and blockage tests were conducted at one stagnation pressure, i.e., 700 psia corresponding to a unit Reynolds number of 9.76 x 10 sup 6 per foot. The results indicate the free stream Mach number has a root-mean-square value of 5.88 and is independent of the unit Reynolds number. The Mach number gradients in both the lateral and longitudinal direction were negligibly small. The total temperature distribution within the test core was invariant with unit Reynolds number and within plus 2% of the stagnation temperature. The test core was approximately 10 inches in diameter as compared to a nozzle outlet diameter of 12.346 inches. Flow angularity within the test core remained relatively small and never exceeded plus and minus 0.05 degrees. (Author)

AD-A012 279/6GA PC$7.25/MF$2.25
Globe-Union Inc Milwaukee Wis Centralab Electronics Div
Production Engineering Measure for Mechanized Production and Test Equipment for Time Setting Potentiometers (CERMET).
Final engineering rept. 1 Jul 71-31 Jul 74,
A. B. Usowski. 4 Oct 74, 210p
Contract DAAB05-71-C-2638

Descriptors: *Potentiometers, Production engineering, Timing devices, Setting(Adjusting), Manufacturing, Cermets, Resistors, Specifications.
Identifiers: *Production engineering measures.

The purpose of the Production Engineering Measure is as follows: To optimize the cermet resistive materials for processing in mechanized facilities at specified rates, yields, and efficiencies; to provide the production engineering required to establish mechanized facilities for manufacturing time setting potentiometers; and, to design and fabricate mechanized production and test equipment on a one-of-a-kind basis to establish and demonstrate a production capability of manufacturing 100K units per month. The report gives the complete project history as well as the specifications and drawings required for the production and quality assurance of the time setting potentiometer.

COM-75-10738/3GA PC$3.75/MF$2.25
National Bureau of Standards, Washington, D.C. Heat Div.
Temperature Section Activity Summary, 1974,
J. F. Schooley. Jun 75, 33p NBS-TN-869
Library of Congress Catalog Card no. 75-600029.
Paper copy also available from GPO as C13.46:869.

Descriptors: *Temperature measurement, Calibrating, Standards, Temperature measuring instruments, Thermocouples.

The report summarizes the progress in calendar 1974 of the technical program of the Temperature Section of the Heat Division, Institute for Basic Standards. Separate sections of the report are devoted to the various projects, to highlights of the year's activities, and to other agency interactions.

COM-75-10740/9GA PC$3.75/MF$2.25
Colorado Univ., Boulder. Dept. of Physics and Astrophysics.
An Earth-Based Coordinate Clock Network.
Final rept.,
Neil Ashby. Apr 75, 37p NBS-TN-659
Contract NBS-CST-8335

Descriptors: *Clocks, Synchronism, Networks, Time, General relativity.

The paper investigates some of the possible operational procedures for synchronizing clocks at fixed sites spread around on the earth's surface, to within a 1 nanosecond level of accuracy. Analysis of a number of effects which might affect clock synchronization is carried out within the framework of general relativity. These effects include the gravitational fields of the earth, sun, and moon, and orbital motion, rotation, and flattening of the earth. It is shown that the only significant effects are due to the gravitational field and rotation of the earth, and motion of the transported clocks. Operational procedures for construction of a synchronized coordinate clock network using light signals and transported standard clocks are discussed and compared.

COM-75-10808/4GA PC$5.75/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
A Pressure-Scanning Refraction Spectrometer for Atmospheric Gas Studies at Millimeter Wavelengths.
Final rept. (Part 2),
Hans J. Liebe. Apr 74, 131p OTR-74-35
Sponsored in part by National Aeronautics and Space Administration, Langley Station, Va. Langley Research Center, and National Environmental Satellite Service, Washington, D.C. See also rept. no. OTR-73-10, Part 1, N74-25886. Paper copy also available from GPO.

Descriptors: *Microwave spectrometers, *Microwave spectra, *Oxygen, *Millimeter waves, Atmospheric attenuation, Refraction, Refractivity, Pressure, Extremely high frequencies.

A differential refraction spectrometer was developed capable of measuring under simulated atmospheric conditions molecular EHF propagation factors, especially the intensity distribution of the oxygen microwave spectrum (O2-MS). Dispersion and attenuation pressure profiles are measured between .001 and 1000. The multi-line (43) structure of the O2-MS around 60 GHz complicates the data analysis. Special diagnostics evolved from the data for deducing spectroscopic parameters. Experimental difficulties and their elimination are discussed. Examples of data taken for the 9(+) line (61.15 GHz) and the 5(-)/7(+) doublet (60.4 GHz) are given.

COM-75-50359/9GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Tests of Cryogenic SQUID for Geomagnetic Field Measurements.
Final rept.,
J. E. Zimmerman, and W. H. Campbell. Apr 75, 16p
Contracts NAonr-18-73, NAonr-21-72

Descriptors: *Magnetometers, Geomagnetism, Cryogenics, Superconductivity.
Identifiers: *Squid devices, Reprints.

A type of cryogenic SQUID (superconducting quantum interference device) magnetometer was designed for geomagnetic measurements. Field tests of the instrument including comparisons to observatory variometers, a rubidium magnetometer, an induction loop, and a fluxgate magnetometer showed the new cryogenic systems to be reliable, accurate, portable and simple to operate. Directional measurements of natural magnetic field fluctuations as small as 0.0001 gamma with periods from 0.5 sec to several hours were demonstrated.

N75-23920/2GA PC$7.50/MF$2.25
Wisconsin Univ., Madison. Space Science and Engineering Center.

Earth Radiation Budget Measurement from a Spinning Satellite: Conceptual Design of Detectors.
L. A. Sromovsky, H. E. Revercomb, and V. E. Suomi. Apr 75, 239p NASA-CR-132494
Contract NAS1-13204

Descriptors: *Energy budgets, *Radiation detectors, *Satellite-borne instruments, *Terrestrial radiation, Calibrating, Equipment specifications, Error analysis, Experimental design, Radiometers, Solar flux.

For abstract, see STAR 1315

N75-23926/9GA PC$3.25/MF$2.25
Scientific Translation Service, Santa Barbara, Calif.
Investigation of Effects of Vibration on a Structure.
May 75, 6p NASA-TT-F-16305
Contract NASW-2483
Tran-Transl. Into English from the German Patent No. P 20 02 633.9-52: W. 14 655170 20/Vo, 12 Jan. 1972 4 p.

Descriptors: *Random vibration, *Real time operation, *Vibration effects, Channels (Data transmission), Signal generators, Vibration damping, Waveforms.

For abstract, see STAR 1315

N75-23928/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Studies on Measuring Ultrasonic Flow with the Aid of the Doppler Effect.
B. Pfau, K. Messmer, H. Meisner, and S. Hagl. Jun 75, 12p NASA-TT-F-16393
Contract NASW-2481
Tran-Transl. Into English from Chem.-Ingenieur-Tech. (West Ger.), V. 40, No. 19, 1968 p 952-956.

Descriptors: *Doppler effect, *Flow distribution, *Flowmeters, *Ultrasonics, Graphs (Charts), Laminar flow, Turbulent flow, Velocity distribution.

For abstract, see STAR 1315

N75-23929/3GA PC$3.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Modern Analytical Measuring Instruments.
V. A. Pavlenko, and M. D. Shutov. Jun 75, 27p NASA-TT-F-16394
Contract NASW-2481
Tran-Transl. Into English from Acta Imeko (Budapest), 1961 p 425-448.

Descriptors: *Automatic test equipment, *Measuring instruments, *Production engineering, Analyzers, Mass spectrometers, Optical equipment, U.s.s.r..

For abstract, see STAR 1315

N75-23932/7GA PC$4.75/MF$2.25
Bolt, Beranek, and Newman, Inc., Cambridge, Mass.
Study of a Porous Surface Microphone Sensor in an Aerofoil.
D. U. Noiseux, N. B. Noiseux, and Y. Kadman. Mar 75, 95p NASA-CR-137652, BBN-3022
Contract NAS2-7790

Descriptors: *Air flow, *Guidance sensors, *Microphones, *Porous walls, Acoustic properties, Airfoils, Graphs (Charts), Noise propagation, Tables (Data), Vibration perception.

For abstract, see STAR 1315

N75-24014/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Diffusion Length Measurements Using the Scanning Electron Microscope.
V. G. Weizer. 1975, 7p NASA-TM-X-71724
Conf-Presented at the 11TH Photovoltaic Specialists Conf., Phoenix, Ariz., 6-8 May 1975; Sponsored by IEEE.

Descriptors: *Diffusion coefficient, *Electron microscopes, *Semiconductor devices, Beam currents, Performance tests, Recombination coefficient, Surface reactions.

For abstract, see STAR 1315

PATENT-3 875 404 Not available NTIS
National Aeronautics and Space Administration. Pasadena Office, Calif.
Wide Angle Sun Sensor.
Patent.
L. L. Schumacher. Patented 1 Apr 75, 8p PAT-APPL-429 437
Misc-Filed 28 Dec. 1973 Supersedes N74-18093 (12-09, p 1049). Subm-Sponsored by NASA.
Government-owned invention available for licensing. Copy of patent available from Commissioner of Patents, Washington, D.C. 20231 $.50.

Descriptors: *Radiation detectors, *Solar radiation, *Patents, Cylindrical bodies, Insulation, Wide angle lenses.
Identifiers: PAT-CL-250-211-R.

A single-axis sun sensor consists of a cylinder of an insulating material on which at least one pair of detectors is deposited on a circumference of the cylinder, was disclosed. At any time only one-half of the cylinder is illuminated so that the total resistance of the two detectors is a constant. Due to the round surface on which the detectors are deposited, the sensor exhibits a linear wide angle of + or - 50 deg to within an accuracy of about 2%. By depositing several pairs of detectors on adjacent circumferences, sufficient redundancy is realized to provide high reliability. A two-axis sensor is provided by depositing detectors on the surface of a sphere along at least two orthogonal great circles.

PATENT-3 883 879 Not available NTIS
Department of the Air Force Washington D C
Portable Pantograph C-Scan Recording Flow Detecting System.
Patent,
Donald D. Kettering. Filed 28 Aug 73, patented 13 May 75, 5p Rept nos. PAT-APPL-392 384, Supersedes AD-164 536.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Ultrasonic tests, *Detectors, *Nondestructive testing, *Patents, Defects(Materials), Detection, Panels, Portable equipment, Manual operation, Scanning.
Identifiers: PAT-CL-346-33-F.

The patent describes a portable, manually scanned, ultrasonic flaw detecting and recording system comprising a suction cup attaching pantograph supporting a transducer head and writing pen for the in-place testing of panels.

PATENT-3 884 884 Not available NTIS
Department of the Air Force Washington D C
Apparatus for Providing an Aerodynamic Window.
Patent,
David B. Wilkinson. Filed 9 May 74, patented 27 May 75, 4p Rept nos. PAT-APPL-468 329, Supersedes AD-164 831.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Pressure, *Housings, *Openings, *Patents, Windows, Gas flow, Impellers.
Identifiers: Aerodynamic windows, PAT-CL-415-53, Pressure differentials.

An apparatus is described in the patent for maintaining a pressure differential across an aperture between two volumes of different pressure having a circular impeller within a chamber of a circular housing with the outer circular wall of the housing being spaced a predetermined distance from the periphery of the impeller. The circular chamber is positioned between two volumes at different pressures. The differential pressure between the volumes turns the gas flow back in the direction of the low pressure volume.

PATENT-3 886 463 Not available NTIS
Department of the Air Force Washington D C
Pulse Width Detector Circuit.
Patent,
Samuel J. Caprio. Filed 9 May 74, patented 27 May 75, 4p Rept nos. PAT-APPL-468 328, Supersedes AD-164 845.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Pulse analyzers, *Patents, Pulse rate, Signal processing, Circuits, Detectors, Logarithmic amplifiers.
Identifiers: PAT-CL-329-106.

The patent describes a pulse width detector circuit in which pulse processing reshapes the output pulse of logarithmic amplifier so that the width of the logarithmic amplifier output pulse equals the width of the logarithmic input pulse at any predetermined percentage peak amplitude level of the logarithmic amplifier input pulse.

PATENT-3 886 551 Not available NTIS
Department of the Air Force Washington D C
Video Slope Rate Detector.
Patent,
Norman G. Hempling. Filed 26 May 72, patented 27 May 75, 4p Rept nos. PAT-APPL-258 001,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Pulse analyzers, *Patents, Slope, Detectors, Video signals, Polarity, Electronic countermeasures.
Identifiers: PAT-CL-34318-E.

The patent describes an apparatus for measuring the rate of change of voltage and the polarity of a pulse having a two input terminal differential amplifier with a delay line connected to one of the input terminals.

PB-242 588/2GA PC$3.75/MF$2.25
Olson Labs., Inc., Anaheim, Calif.
FTP/Short Cycle Correlation Testing for 207 (b) Implementation - Catalyst Equipped Vehicles. Volume I.
Final rept.,
J. A. Gunderson. Apr 75, 50p EPA/460/3-75-003-a
Contract EPA-68-03-0452
See also PB-242 589.

Descriptors: *Exhaust emissions, *Tests, Experimental design, Laboratory equipment, Air pollution control equipment, Automobiles, Automobile engines, Dynamometers, Gas analysis, Exhaust gases.
Identifiers: Catalytic reactors(Exhaust systems), *Automobile exhaust.

The objective of the work performed under this contract was to provide test data leading to the

identification of which of five existing short-cycle emissions tests is most capable of being 'correlated' with the Federal Test Procedure (FTP) as used for the certification of 1975 model year and later light-duty vehicles. The five short-cycle emission tests are: Clayton key mode - volumetric procedure; Federal three-mode - volumetric procedure; Unloaded test, high speed (2,500 rpm) and idle (derived from 1 and 2) - volumetric procedure; Federal short cycle (9-mode) - CVS procedure; and Composite N.J. ACID/N.Y. short test - CVS procedure. Fifty-eight catalyst equipped experimental vehicles were tested. Design, equipment, and data handling are described.

PB-242 589/0GA PC$10.25/MF$2.25
Olson Labs., Inc., Anaheim, Calif.
FTP/Short Cycle Correlation Testing for 207 (b) Implementation - Catalyst Equipped Vehicles. Volume 2.
Final rept.,
J. A. Gunderson. Apr 75, 396p EPA/460/3-75-003-b
Contract EPA-68-03-0452
See also PB-242 588.

Descriptors: *Tests, *Exhaust emissions, Tables(Data), Experimental data, Exhaust gases, Calibration, Dynamometers, Gas analysis, Automotive fuels.
Identifiers: *Automobile exhaust.

This volume contains appendices to a report comparing five existing short-cycle emissions tests to the Federal Test Procedure. Included are emission test results, test fuel analysis, analyzer calibration curves, the CUS calibration curve, dynamometer calibration curves, and the Ford catalyst test vehicle maintenance history.

14C. Recording Devices

N75-23930/1GA PC$3.75/MF$2.25
Battelle Columbus Labs., Ohio.
Holographic Recording Materials Development.
Final Report, 29 May 1974 - 24 Mar. 1975.
24 Mar 75, 45p NASA-CR-132672
Contract NAS1-12324

Descriptors: *Dyes, *Holography, *Stilbene, Absorption spectra, Isomerization, Legibility, Lithium niobates, Organic materials, Photochemical reactions, Polymers.

For abstract, see STAR 1315

14D. Reliability

AD-A012 062/6GA PC$3.75/MF$2.25
Southwest Research Inst San Antonio Tex
Methodology Investigation. A Comparison of Reliability Tests for Avionics Equipment Onboard U.S. Army Helicopters.
Final rept. 3 Apr 72-30 May 75,
Daniel D. Kana. Apr 75, 40p
Contract DAAD05-72-C-0228

Descriptors: *Transmitter receivers, *Reliability(Electronics), *Avionics, Methodology, Helicopters, Radio equipment, Vibration.
Identifiers: AN/ARC-115.

An investigation was conducted to determine which of several reliability tests provided a most realistic representation of field environments experienced by avionics equipment onboard US Army helicopters. Originally the program was scheduled to test a total of twenty-five AN/ARC-115 radios in groups of five, where each group was subjected to a different reliability test. Flight tests, bench tests, AGREE tests, uniaxial vibration tests, and triaxial vibration tests were the selected environments in which the radios were to be operated under simulated conditions, functional checks performed as required, and any failures noted.

14E. Reprography

AD-A011 704/4GA PC$4.25/MF$2.25
Minnesota Mining and Mfg Co St Paul
Dry Silver Camera Film, Aerial Exposure Index = 5.
Final rept. Jul 73-Nov 74,
Robert Russell, Jack E. Reece, Kathy Evlen, Steve Gaudette, and John Geiser. Mar 75, 70p
AFAL-TR-75-11
Contract F33615-73-C-1273

Descriptors: *Photographic film, *Dry photographic processing, *Aerial photography, *Reconnaissance film, Silver, Coatings, Performance tests, Color photography, High speed photography.
Identifiers: Multiband spectral reconnaissance.

This report describes achievements of a special film coating and testing program for panchromatic sensitive photographic film for direct optical recording from 350 through 750 nanometers wavelength. A new panchromatic sensitive recording film is described which has suitable sensitivity for photorecording at aerial exposure index values from 3 to 5. This film is unique in that the exposed latent images may be converted to visible metallic silver image form using only thermal processing instead of wet chemical processing normally required for silver halide type recording films. The report also describes the results from limited aerial photographic flight testing of this new film in an RF-101 Tactical Reconnaissance Aircraft in a standard Air Force KS-87 aerial camera. Printed replicas are included in this report of photographic results obtained from camera exposures.

AD-A012 341/4GA PC$8.75/MF$2.25
Ram2 Task Force (Army) Alexandria Va
Microfiche Records Test (Phase II).
Interim rept. 4 Sep 73-25 Jan 74,
Leonard S. Lee, Bobby Davis, and Robert D. Legg. 8 Mar 74, 283p Rept no. 75-03A

Descriptors: *Microfiche, *Records, Personnel management, Army personnel, Photographic images, Photographic materials, Selection, Reproduction(Copying), Photographic processing, Questionnaires, Statistical analysis, Surveys, Maintainability, Handling, Feasibility studies.
Identifiers: *Records managements.

In a continuing effort to improve military personnel records maintenance and personnel management functions, the Army, in March 1973, organized a study group (RAM2 Task Force) to design and test the feasibility of converting military personnel records to microform images. During Phase I of the study, micromedia techniques and equipment were surveyed and evaluated and a prototype design selected employing a microfiche records concept; i.e., 98 micro-images on a 4 in. x 6 in. plastic base. Phase II of the study (Sep 73-Jan 74) included operation of a microfiche production facility, actual conversion to microfiche of 2603 OMPF and 194 CBIF of active duty officers, warrant officers and enlisted personnel files, and the subsequent testing of these microfiche records in an operational military personnel management environment. This interim report describes the operations of the microfiche facility, the conduct of the pilot test, and the findings of the test.

N75-23921/0GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Radiometric Performance of the Viking MARS Lander Cameras.
F. O. Huck, E. E. Burcher, E. J. Taylor, and S. D. Wall. Apr 75, 53p NASA-TM-X-72692

Descriptors: *Cameras, *Radiometers, *Viking lander spacecraft, *Viking mars program, Performance prediction, Photodiodes, Photosensitivity, Signal to noise ratios, Tables (Data).

For abstract, see STAR 1315

15. MILITARY SCIENCES

15E. Logistics

AD-A011 805/9GA PC$3.75/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Study of Domestic Hot Water Use in Navy Bachelor Enlisted Quarters.
Rept. for Jan 71-Mar 74,
J. C. King. Apr 75, 37p Rept no. CEL-TN-1387

Descriptors: *Hot water, *Consumption, *Military facilities, Heaters, Water tanks, Surveys, Military requirements.

To obtain criteria specifically applicable to Bachelor Enlisted Quarters (BEQ), the Naval Facilities Engineering Command (NAVFAC) requested that the Civil Engineering Laboratory (CEL), Port Hueneme, CA, conduct a detailed investigation, using metering the recording instrumentation in recruit- and service-type BEQs in northern, southern, and tropical climates. From data thus obtained, CEL could develop criteria for the sizing in new BEQ installations of domestic water heaters and hot water storage tanks to cover a wide range of climatic areas. This report covers work done by CEL in this investigation. The resulting design criteria are presented for each type of BEQ as a series of curves, showing required heater recovery as a function of storage tank volume with inlet cold water temperature as a design parameter. This approach permits the designer to examine trade-offs between heater recovery and storage volume so that a minimum-cost installation can be selected.

AD-A011 823/2GA PC$4.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md Computation and Mathematics Dept
Preliminary Design Specification for the NAVLIS Pilot Network Project,
B. A. Wallis, I. L. Avrunin, H. W. Mangan, and J. R. Carlyle. 1 Apr 74, 52p Rept no. CMD-22-74
Prepared in cooperation with Rockwell International Corp., El Segundo, Calif.

Descriptors: *Information retrieval, *Data management, *Naval logistics, Data processing, Decision making, Data bases.
Identifiers: NAVLIS(Navy Logistics Information Sharing), Navy logistics information sharing, Logistics management, COBOL.

The NAVLIS Pilot Network Project will consist of the development and implementation of a distributed data base management system operating on the computers and with the data files at Fleet Data Processing Service Center Pacific (DPSCPAC), Fleet Data Processing Service Center Atlantic (DPSCLANT) and the Naval Material Command Support Activity, (NMCSA), Washington, D.C. DPSCPAC will be the master node or executive site of this three node network. Users will interrogate the network from a remote terminal at any location. The master site executive software will control query processing, and determine location of file or files to be queried. Messages will be sent from the master site via telecommunications to the satellite computer. Satellite software will interpret the message, locate appropriate files,

retrieve requested information and send results to the master site. Results will be formatted and output to the user at the terminal. The pilot network will serve as a vehicle for testing the technical feasibility of the NAVLIS baseline concept, for testing user reaction and requirements, and for estimating system implementation costs.

AD-A012 063/4GA PC$7.25/MF$2.25
Army Troop Support Command St Louis Mo
Proceedings of the Advanced Planning Briefing for Industry on Troop Support for the Future, Held at Humphreys Hall, Fort Belvoir, Va. on 26-27 March 1974.
1974, 224p

Descriptors: *Army equipment, *Army procurement, *Army planning, *Meetings, Mobility, Land mines, Countermining, Intrusion detectors, Camouflage, Materiel, Military supplies, Construction equipment, Field equipment, Clothing, Life support, Air drop operations, Industries.

Contents: Mobility equipment research and development; Countermine/counter intrusion; Military technology and camouflage and engineering topographic equipment; Electrotechnology; Mechanical technology construction equipment and environmental control equipment; Petroleum and materials; Clothing and personal life support equipment; Airdrop systems and equipment; General equipment and packaging.

AD-A012 064/2GA PC$7.25/MF$2.25
Dustin Associates Inc Santa Ana Calif
Comparative Analysis of Functionally Oriented Maintenance Manuals (MIL-M-24100B) and Conventional Maintenance Manuals (MIL-M-38784).
Final rept. Jun 74-Mar 75,
Leslie L. Potts, and Daniel V. Stone, Jr. Mar 75, 202p Rept no. 5440 ACC-CC-OP-PI-1
Contract DAEA18-74-C-0309

Descriptors: *Maintenance management, *Manuals, Comparison, Cost effectiveness, Utilization, Diagrams, Performance, Test methods, Army equipment, Maintainability.
Identifiers: Technical manuals, Maintenance manuals, Recommendations.

The purpose of this investigation was to compare Functionally Oriented Maintenance Manuals (FOMM) and conventional manuals for their usability and cost effectiveness. Tests for student comprehension were conducted to determine how well FOMM and conventional manuals can be used for resident training. Tests were also conducted to compare the clarity of FOMM and conventional diagrams. The study includes a discussion of the development of FOMM and a summary of previous studies. The report recommends procurement of FOMM for new electronic equipments, and for old equipment with a history of poor maintainability.

AD-A012 151/7GA PC$4.25/MF$2.25
Amc Inventory Research Office Philadelphia Pa
Improvements to the Loss/Loss Recovery Reporting System.
Final rept.,
Steven Gajdalo. Jun 75, 52p Rept no. IRO-233

Descriptors: *Army equipment, *Inventory control, *Logistics planning, Losses, Recovery, Data processing, Systems analysis, Logistics support, Army planning.
Identifiers: *CBS(Continuous Balance System), *Continuous balance system, *Logistics management.

For major items of equipment there is a need for loss and loss recovery data but there is no viable system to provide them. This report shows how the requisite data can be had as a by-product of the Continuous Balance System (CBS), which is a system to arrive at the worldwide asset position using transaction data. It also discusses operational deficiencies that might have an adverse effect on the quality of the data and recommends solutions.

AD-A012 156/6GA PC$3.75/MF$2.25
Army Armament Command Rock Island Ill Systems Analysis Office
Simulation and Analysis of the Service Section of the Procurement and Production Directorate.
Technical note,
Robert C. Banash, and George H. Martin. May 75, 37p Rept no. SAO-Note-3

Descriptors: *Army procurement, *Contracts, *Systems analysis, Processing, Time, Savings, Work elements, Personnel management, Computer programs, Computerized simulation, Forecasting, Mathematical models.
Identifiers: ALT(Administrative Lead Time), Administrative lead time.

The study was part of a larger investigation into the ALT (Administrative Lead Time) for the Service Section of Procurement and Production P and P) Directorate (WECOM). The purpose of the analysis is to examine the possibility of reducing processing time in terms of methods and personnel resources. The methodology is applicable to the ARMCOM P and P Service Section.

AD-A012 164/0GA PC$4.75/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Infantry Applications of the Night Vision Goggles, AN/PVS-5. (A Pilot Study-September 1974).
Final rept.
Feb 75, 78p Rept no. HEL-TN-3-75

Descriptors: *Goggles, *Human factors engineering, *Night vision devices, Night vision, Infantry, Compatibility, Helmets, Mobility, Field tests, Performance(Human), Night warfare.
Identifiers: AN/PVS-5.

Mobility and compatability tests of the AN/PVS-5 night vision goggles for infantry applications were conducted during August 1974 at Aberdeen Proving Ground, MD. Daylight observations of static relationships between the goggles and selected clothing/equipment ensembles were made. In addition, field observations, attitudinal measures and obstacle times are reported for 12 soldiers performing with the goggles at night, in combat ensemble over a 500-meter assault course. Recommendations for improvement of goggle design and further research are provided.

AD-A012 240/8GA PC$3.25/MF$2.25
Aeronautical Systems Div Wright-Patterson AFB Ohio Bare Base Equipment Spo
Bare Base System Air Lift Study.
Feb 73, 19p Rept no. ASD/SMB-437A-73-004

Descriptors: *Supply depots, *Air Force facilities, *Air transportable equipment, *Airlift operations, Air Force equipment, Reusable equipment, Logistics support, Global, Deployment, Cargo, Loading(Handling), Weight, Shelters, Drinking water, Water supplies, Electric power plants, Maintenance equipment, Operational readiness, Air transportation, Cargo aircraft, Jet transport planes, Air Force operations, Payload, Air Force Systems Command.
Identifiers: *Bare base equipment system-437A, C-130 aircraft, C-141 aircraft, Logistics management.

Bare Base System 437A depends on efficient transportation of equipment in principally C-130 aircraft and secondly in C-141 aircraft. This study identifies the limiting transportation characteristics of Bare Base Equipment listed in the System Package Program (SPP) with respect to size and weight. The study lists on-hand equipment and equipment in the procurement cycle separately. (Author)

AD-A012 241/6GA PC$3.25/MF$2.25
Aeronautical Systems Div Wright-Patterson AFB Ohio Bare Base Equipment Spo
System Specification for the Bare Base Equipment System-437A,
John E. Catlin, Jr. Dec 72, 53p Rept no. ASD/SMB-437A-71-0004A

Descriptors: *Supply depots, *Air Force facilities, *Air transportable equipment, *Airlift operations, Specifications, Air Force equipment, Reusable equipment, Logistics support, Global, Deployment, Quality assurance, Reliability, Maintainability, Air Force training, Maintenance personnel, Safety, Moistureproofing, Fungusproofing, Operational readiness, Air transportation, Cargo aircraft, Jet transport planes, Air Force Systems Command, Air Force operations, Payload.
Identifiers: *Bare base equipment system-437A, C-130 aircraft, C-141 aircraft, Logistics management.

This specification establishes the performance, design, development and test requirements for the Bare Base Equipment System (437A). (Author)

AD-A012 242/4GA PC$4.75/MF$2.25
Aeronautical Systems Div Wright-Patterson AFB Ohio Bare Base Equipment Spo
Bare Base Equipment Description.
Aug 73, 94p Rept no. ASD/SMB-437A-73-0076

Descriptors: *Supply depots, *Air Force facilities, *Air transportable equipment, *Airlift operations, Air Force equipment, Reusable equipment, Logistics support, Global, Deployment, Shelters, Drinking water, Water supplies, Electric power plants, Hangars, Food dispensing, Hospitals, Maintenance equipment, Operational readiness, Air transportation, Cargo aircraft, Jet transport planes, Air Force Systems Command, Air Force operations, Payload.
Identifiers: *Bare Base equipment system-437A, C-130 aircraft, C-141 aircraft, Logistics management.

The basic mission of the Bare Base Equipment Program is to provide a means to meet the nation's global committments by enabling the USAF to establish tactical air superiority through rapid, effective deployment to any contingency area by means of relocatable, air transportable equipment and facilities. Thus, Bare Base 437A provides a cost effective system by lowering the long-term operational and/or repeated deployment costs through (1) eliminating permanent construction, (2) recovering deployed structures and facilities for redeployment, and (3) using existing air bases in the United States or overseas as the permanent homes of the tactical forces, thus reducing higher overseas operational costs. (Author)

15G. Operations, Strategy, and Tactics

AD-A012 363/8GA PC$3.75/MF$2.25
Aeronautical Systems Div Wright-Patterson AFB Ohio Bare Base Equipment Spo
Bare Base Sortie Study,
Eugene A. Gregory. Jan 74, 27p Rept no. ASD/SMB-437A-72-0003B

Descriptors: *Air force operations, *Air Force planning, Deployment, Air Force personnel, Air Force equipment, Shelters, Public utilities, Vehicles, Maintenance equipment, Jet fighters, Cargo aircraft.
Identifiers: C-130 aircraft, F-4 aircraft, RF-4 aircraft, *Bare base support, *Bare base project, Sorties.

The number of C-130 sorties required for Bare Base System 30 day deployment of 4500 personnel are presented in this document. Five TFSs are supported by the 4500 man BASS. Maintenance Operations Support Set (MOSS) equipment for the applicable type of weapon system deployment is included. For this study, MOSS equipment for three F-4, one RF-4, and one C-130 MOSS are considered for the 4500 man deployment. This study groups the 437A Bare Base Equipment in five separate categories: Shelters, Utilities, Support Subsystems, Vehicles and Base Maintenance Equipment.

AD-A012 400/8GA PC$3.75/MF$2.25
New York Univ Ny Graduate School of Public Administration
An Approach to the Measurement of the Short Term Readiness of Military Systems.
Technical rept.,
Seymour Kaplan. 15 Jun 75, 30p Rept no. TR-10
Contract N00014-67-A-0467-0028

Descriptors: *Naval operations, *Naval vessels, *Readiness, Measurement, Methodology, Mission profiles, Naval research.

This paper develops an approach to the measurement of short term readiness of military systems. Readiness is assumed to be expressed in terms of values associated with the system state when various resource requirements are imposed upon the system as a result of the specification of a set of 'missions'. These values are directly related to the ability of the system to complete these missions.

16. MISSILE TECHNOLOGY

16B. Missile Trajectories

AD-A011 828/1GA PC$6.25/MF$2.25
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Extending the Intercept Range of Tactical Missiles Against Jamming Targets.
Technical memo.,
J. E. Kain, and D. J. Yost. Feb 75, 163p Rept no. APL/JHU-TG-1264
Contract N00017-72-C-4401

Descriptors: *Intercept trajectories, *Terminal guidance, Kalman filtering, Jamming, Monte Carlo method, Computer programs, Data processing, Mathematical models.
Identifiers: Nonlinear filtering.

The main emphasis of this report is on the application of nonlinear filtering techniques to state estimation of radiating targets in range-denied systems. The mathematical model for the measurements and the target dynamics is derived, with emphasis on the development of a simplified model for the correlated errors introduced by the inertial reference unit. The nonlinear estimators considered (triangulation, extended Kalman filter, and Gaussian second-order filter) are evaluated using linearized covariance and Monte Carlo methods. Large initial errors often resulted in poor performance for the extended Kalman filter, while the Gaussian second-order filter provides acceptable performance.

AD-A011 939/6GA PC$12.50/MF$2.25
Aerospace Corp El Segundo Calif
Trajectory Reconstruction Program Milestone 2/3 Report. Volume II. Equations and Logic. Part A. Input and Executive Modules,
M. J. Rademacher, and W. F. Rearick. 10 Jan 75, 531p Rept no. TR-0075(9320)-3-vol-2-pt-a SAMSO-TR-75-90-Vol-2-Pt-A
Contract F04701-74-C-0075
See also Volume 1 dated 16 Dec 74, AD-A009 842.

Descriptors: *Guided missile trajectories, *Computerized simulation, *Computer programming, Ascent trajectories, Descent trajectories, Mission profiles, Numerical integration, FORTRAN, User needs.
Identifiers: IBM 360 computers, IBM 370 computers, CDC 6600 computers, CDC 7600 computers, UNIVAC 1108 computers, UNIVAC 1110 computers, TRP systems.

The Trajectory Reconstruction Program (TRP) system consists of vehicle simulation subprograms designed and written in FORTRAN for CDC 6600/7600, IBM 360/370, and UNIVAC 1108/1110 series computers. The overall simulation system has been designed to accommodate extreme variations in vehicle configuration, flight profile, and mission objective and to provide a fast reaction to specific simulations at minimal cost. This simulation system consists of a family of computer subprograms from which a judicious selection can be made to form a specific simulation system for a particular simulation task. Two major design features of the TRP system make it general and versatile. Its modular construction concept (each module contains several models) allows the user to choose those suited to his simulation. Variations in flight profile are accommodated by input at event times only. This document is published in two volumes. Volume I provides a basic review of the functional design, input data philosophy, capabilities, and interface details. Volume II: Equations and Logic is published in three parts for user convenience. Information needed for day to day TRP operation is provided in the Milestone 7 Report, which is published as TR-0075(9320)-4.

N75-23633/1GA PC$6.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Collection of Problems on the Dynamics of a Point in a Central Force Field.
Y. N. Polyakhova. May 75, 169p NASA-TT-F-16263
Contract NASW-2481
Tran-Transl. Into English from the Book "Sbornik Zadach Po Dinamike Tochki V Pole Tsentral'Nykh Sil" Leningrad, Leningrad Univ. Press, 1974 p 1-145.

Descriptors: *Gravitational effects, *Gravitational fields, *Space flight, *Space mechanics, Kepler laws, Orbital mechanics, Trajectory analysis, Transfer orbits.

For abstract, see STAR 1315

17. NAVIGATION, DETECTION, COMMUNICATIONS, AND COUNTERMEASURES

17A. Acoustic Detection

AD-A011 918/0GA PC$3.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Characterization of Sonar Targets.
Technical memo.,
P. W. Smith, Jr. 5 May 75, 27p Rept no. BBN-TM-244
Contract N66001-75-C-0056

Descriptors: *Sonar targets, *Signal processing, Sonar echoes, Sampling, Analysis of variance, Mathematical models.

An initial investigation has been made into those characterizations of the strength of sonar target echoes that are relevant to mobile tactical sonars. The primary focus of the investigation is on the statistical characterization of echos, in a format compatible with applications to studies of sonar design and utilization and to mathematical modelling and scaled physical modelling of targets. The sonars whose performance is considered are those characterized by the following chain of elements: signal generator, beamformer, filter (possibly matched filter or correlator), envelope detector and squaring (or equivalent), post-detection integration, decision and display. The parameters of these elements (e.g., resolution time, averaging time) are not specified.

AD-A012 343/0GA PC$4.25/MF$2.25
Naval Research Lab Washington D C
An Experimental Description of a Free-Flooded Finite-Length Radiating Magnetostrictive Ring Transducer.
Interim rept.,
Joel A. Sinsky. 4 Jun 75, 56p Rept no. NRL-7887

Descriptors: *Magnetostriction, *Electroacoustic transducers, *Magnetostrictive elements, Cylindrical bodies, Nickel, Rings, Wire, Winding, Electrical impedance, Acoustic fields, Acoustic measurement, Underwater sound signals.
Identifiers: Free flooded rings.

The electrical input impedances and acoustic radiation characteristics of magnetostrictive scroll-wound ring transducers were carefully measured and documented to provide experimental data for comparison with theoretical ring-transducer models. Conventional-nickel and cube-textured-nickel rings with equivalent diameter and thickness but with varying lengths were used in the experiment. The data were compared to the theoretical model, NRL EIGSHIP, a computer program of a mathematical analysis of the electroacoustic performance of a single finite-length magnetostrictive circular cylinder submerged in an unbounded medium and radiating sound. The experiment is described, the data are tabulated and plotted, possible sources of error are suggested, and a comparison is made with theory. (Author)

17B. Communication

AD-A011 681/4GA PC$3.75/MF$2.25
National Aviation Facilities Experimental Center Atlantic City N J
Channel-Loss Detector for Low-Traffic Teletype Circuits.
Final rept. Jan 73-Oct 74,
Charles Santora. May 75, 30p Rept no. FAA-NA-74-50 FAA-RD-75-1
Contract FAA-064-222-000

Descriptors: *Teletype systems, Monitors, Communications networks, Digital systems, Air traffic control systems.
Identifiers: DOT/4HZ/HD.

The report describes a prototype device for application at international flight service stations to detect teletype channel loss by providing an idle signal in the absence of messages and activating alarms when continuity is disrupted or a failure occurs which disables teletypewriter communication. Two units, each comprised of send and receive channel-loss detectors and teletypewriter circuit interfaces and associated alarms, were developed and evaluated at the National Aviation Facilities Experimental Center in accordance with Systems Research and Development Service, Washington, requirements and were found to perform satisfactorily. As a digital device, the channel-loss detector may lend itself to other communication applications as needed.

AD-A011 709/3GA PC$3.75/MF$2.25
Nicolet Scientific Corp Northvale N J
Study and Development of the INTEL Technique for Improving Speech Intelligibility.
Final technical rept. Sep 73-Dec 74,
M. R. Weiss, E. Aschkenasy, and T. W. Parsons.
Apr 75, 44p RADC-TR-75-108
Contract F30602-74-C-0058

Descriptors: *Speech recognition, *Signal to noise ratio, Voice communications, Noise reduction, Fourier Transformation, Stochastic processes.
Identifiers: *INTEL technique, Cepstrum technique, *Speech intelligibility.

This report describes theoretical and experimental studies done to improve the performance of INTEL, a process for improving the signal-to-noise ratio of speech which has been corrupted by wideband noise. The theoretical study is a detailed statistical study of the process, showing how it works, why its effect on speech is different from its effect on noise, and why the cepstrum, a closely similar process, does not provide similar benefits. The experimental studies were explorations suggested by previous studies. These studies implemented various modifications to the basic process in the hope that they would improve its performance. The modifications were: Threshold clipping, Center clipping, Harmonic emphasis, and Adaptation to narrow-band speech. In addition, a number of experiments were conducted to study the effect of phase on speech intelligibility.

AD-A011 711/9GA PC$3.75/MF$2.25
Mitre Corp Bedford Mass
Multiplex Bus Data Waveform Spectra,
J. Maeks. May 75, 33p Rept no. MTR-2963 ESD-TR-75-64
Contract F19628-75-C-0001

Descriptors: *Time division multiplexing, *Bus conductors, Aircraft equipment, Data transmission systems, Spectral energy distribution, Digital systems.

The paper contains a derivation of the formula for the average energy spectral density of a multiplex bus data word. It also contains graphs of the spectral density and the cumulative distribution of energy versus frequency.

AD-A011 729/1GA PC$4.75/MF$2.25
North Electric Co Galion Ohio Government Products Div
Two/Four Wire Digital Subset.
Interim rept.
May 75, 84p RADC-TR-75-130
Contract F30602-74-C-0300

Descriptors: *Data transmission systems, Digital systems, Multiplexing, Time division multiplexing, Telephone lines.

This interim technical report contains information regarding the transmission of digital signals over 2 wire transmission facilities on a full duplex basis, heretofore only possible over 4 wire transmission facilities. It covers the results derived from a study of wire transmission characteristics. Based on the results of this study, three techniques are described as potential candidates. They are as follows: (1) Frequency Division Multiplexing Technique; (2) Signal Superimposition Technique whereby digital signals traversing in opposite directions are shifted in such a manner that the outgoing digital signal transitions occur in the middle of an incoming digital stream thereby enabling both signals to be recovered; (3) Time Division Multiplexing Technique. The conclusions indicate that, although all three techniques described above are technically feasible, only 2 and 3 offer economical advantages.

AD-A011 824/0GA PC$3.75/MF$2.25
Naval Underwater Systems Center New London Conn New London Lab
PROJECT SANGUINE.
Quarterly technical summary rept. 1 Jul-30 Sep 74.
6 Jun 75, 28p Rept no. NUSC-TR-4907

Descriptors: *Communication and radio systems, Extremely low frequency, Electromagnetic fields, Measurement, Radio transmission, Underwater communications.
Identifiers: *Sanguine project.

The work reported includes field measurements concerned with extremely low frequency propagation, and distribution of powerline fields in the sea near New London, Connecticut.

AD-A011 839/8GA PC$3.75/MF$2.25
Massachusetts Inst of Tech Cambridge Artificial Intelligence Lab
Localization of Failures in Radio Circuits. A Study in Causal and Teleological Reasoning,
Allen L. Brown, and Gerald Jay Sussman. Dec 74, 30p Rept no. AI-M-319
Contract N00014-70-A-0362-0005

Descriptors: *Radio equipment, *Failure(Electronics), Faults, Isolation, Circuits, Detection, Computer applications.

The paper examines some methodologies for diagnosing correctly designed radio circuits which are failing to perform in the intended way because of some faulty component. Particular emphasis is placed on the utility and necessity of good teleological descriptions in successfully executing the task of isolating failing components.

AD-A011 924/8GA PC$9.25/MF$2.25
Atlantic Research Corp Alexandria Va
Long-Range Sensor Communication.
Final technical rept.,
Charles B. Sykes, and Richard G. Robertson.
May 75, 315p Rept no. TR-PL-10132 RADC-TR-75-116
Contract F30602-72-C-0427

Descriptors: *Communication and radio systems, *Intrusion detectors, *Remote detectors, Intrusion detection, Long range(Distance), Ionospheric propagation, Ground waves(Electromagnetic), Diversity reception, Errors, High frequency, Medium frequency, Forward scattering, Modulation.
Identifiers: Remote sensing.

A performance study was conducted to determine the feasibility of direct long-range remote sensor communications without the use of relays. Of the propagation modes analyzed, HF ionospheric, MF,HF ground-wave, and forward meteor scatter, the HF ionospheric propagation mode is favored and performance predictions using this mode for digital message transmission are presented. The performance is given in terms of predicted message error rate and circuit outage under various conditions of range, frequency, hour, season, sunspot number and geographic location.

AD-A012 102/0GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
Reliability Estimates of Time Division Multiplex Systems During Design Stages,
D. N. Zhmurin. 27 Sep 74, 9p Rept no. FSTC-HT-23-920-74
Trans. from Izvestiya Vysshikh Uchebnykh Zavedenii. Elektromekhanika (USSR) n2 Feb 70.

Descriptors: *Data transmission systems, *Time division multiplexing, *Reliability(Electronics), Synchronization(Electronics), Gates(Circuits), Semiconductor devices, Translations, USSR.

A method is proposed for comparing different time division multiplex systems. This method takes into account synchronization questions in the choice of a most reliable variation in working out the block diagram of a proposed system. The assumptions are given which underlie the use of a method for determining the reliability of an information transmission circuit. A semiquantitative expression for system reliability, useful during design stages is given, and three examples are discussed.

AD-A012 104/6GA PC$3.75/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
High Information Delta Modulation,
G. G. Menshikov. 27 Sep 74, 27p Rept no. FSTC-HT-23-919-74
Trans. of Proceedings IFAC Symposium, Budapest 8-11 Apr 68, p417-428.

Descriptors: *Data transmission systems, *Delta modulation, Digital differential analyzers, Signal processing, Algorithms, Theorems, Translations, USSR.

The article is a study of the discrete distributed version of delta-modulation with increased information proposed by Winkler. This version represents the task of approximation of given successive numbers f. The features of an algorithm of this approximation are studied. The relating expressions and estimations are derived. All the possibilities of the process of approximation are analysed, which can be used for other problems of delta-modulation.

AD-A012 163/2GA PC$3.75/MF$2.25
Army Electronics Command Fort Monmouth N J
Computer Aided Mobile Shelter Design.
Technical rept.,
George Panagos. Jun 75, 27p Rept no. ECOM-4329

Descriptors: *Interactive graphics, *Computer aided design, Electronic equipment, Vehicles, Computer programming, Communication equipment, Computer graphics.
Identifiers: *Layout problems, *Mobile equipment.

The computer aided Mobile System Design project (MSD) for devising improved mobile communications-electronics (C-E) shelter/vehicular configurations analysis capability has been divided into four problem-oriented study tasks. This report documents Transport and Mobility Layout for this design area and discusses some of the program features for effective CAD. The MSD set of programs, implemented on the MEDEA Interactive Design Terminal allows the designer to use interactive graphics to accomplish dynamic placement of equipment in a shelter or vehicle. Given such shelter/vehicle and equipment inputs as name or ID, weight, dimensions and center of gravity coordinates, the program determines the center of gravity of the equipment assembly and tests for compliance with weight distribution and lateral stability requirements of ECOM Technical Requirement SCL-1280D. The program outputs: (1) Weight, center of gravity coordinates and moment for each equipment, (2) Combined weight and center of gravity coordinates, (3) Percent lateral stability and overweight and (4) Planview, curbside, roadside, and perspective views.

AD-A012 218/4GA PC$7.00/MF$2.25
Mitre Corp Bedford Mass
Preliminary AFBITS Network Control System.
Technical rept.,
H. R. Clark, M. S. Cogan, H. I. Cohen, G. C. Dempsey, and R. P. Witt. Jun 75, 177p Rept no. MTR-2925 ESD-TR-75-66
Contract F19628-75-C-0001

Descriptors: *Communications networks, Broadband, Data transmission systems, Video networks, Voice communications, Minicomputers, Interfaces, Central processing units, Data processing terminals, Air Force facilities.
Identifiers: PDP-11 computers, AFBITS(Air Force Base Information Transfer System), Air Force base information transfer system.

This report describes a network control system for a coaxial cable based, multi-mode communication facility to be used for audio, video and data services on future Air Force Base communications installations. A detailed description is provided of the software for a minicomputer-based network control program and the hardware for a low cost out-of-band signaling and supervision system that can be frequency multiplexed on a broadband communications system.

AD-A012 230/9GA PC$7.00/MF$2.25
TRW Systems Group San Bernardino Calif Minuteman Communications and Command Dept
MINUTEMAN FSD Communications Study Report.
Final rept.,
D. Vassilakos, and T. R. Hooton. May 75, 181p Rept no. TRW-26048-11850TU-00 SAMSO-TR-75-122
Contract F04701-74-C-0327

Descriptors: *Surface to surface missiles, *Hardened structures, *Communications networks, Command and control systems, Communications central, Launching sites, Guided missile silos, Secure communications, Computer programs, Modems, Computerized simulation.
Identifiers: Minuteman.

The present MINUTEMAN Cable Termination Equipment (CTE) design, most of which was developed in the 1950's using discrete components, was a good design for that era but by present (1975) standards it is large, sluggish and cumbersome. Thus, the goal of this program was to investigate the present state-of-the-art and to develop a reliable system with much improved performance using modern but proven techniques. Other design objectives were to increase hardness and decrease cost. A programmable processor was chosen to maximize operational efficiency, flexibility and growth capability.

AD-A012 261/4GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park
The Effect of Pulse Shape and Duty Cycle on Laser Binary Communication Systems,
Gerard Lachs, and James A. Quarato. 20 Jul 73, 6p ARO-8936.9-E
Contract DAHC04-70-C-0056
Availability: Pub. in IEEE Transactions on Aerospace and Electronic Systems, vAES-11 n2 p226-270 Mar 75.

Descriptors: *Laser communications, *Binary processors, Pulsed lasers, Pulse duration modulation, Errors, Probability, Reprints.
Identifiers: *Binary communication systems, Duty cycle, Pulse shape, Lorentzian spectral shape.

The result of an investigation of the effects of pulse shape and duty cycle on the probability of error are presented for a pulse-gated binary modulation (PGBM) laser communication system when the background irradiance has the important Lorentzian spectral shape. (Author)

AD-A012 305/9GA PC$3.75/MF$2.25
Mitre Corp Bedford Mass
A Comparison of Time Division Multiplex Data Buses Based on Computer Simulation,
B. B. Mahler, R. A. Costa, and E. F. Boose. May 75, 44p Rept no. MTR-2960 ESD-TR-75-60
Contract F19628-75-C-0001
See also report dated Mar 75, AD-A008 498.

Descriptors: *Bus conductors, *Data transmission systems, Time division multiplexing, Avionics, Digital systems, Computerized simulation, Waveforms.

This report compares waveforms, signal losses, and stub impedances for three computer simulated time division multiplex buses. Two of the simulations use coupling transformers to judiciously mismatch the stubs to the main bus. The third (and superior) configuration accomplishes the required mismatch by using a higher characteristic impedance wire for the stubs with no coupling transformer.

AD-A012 307/5GA PC$8.50/MF$2.25
Georgia Inst of Tech Atlanta School of Electrical Engineering
Pitch and Voicing in Speech Digitization.
Final rept. 15 May 73-15 May 74,
T. P. Barnwell, J. E. Brown, A. M. Bush, and C. R. Patisaul. 15 Aug 74, 263p Rept no. E21-620-74-BU-1
Contract F30602-72-C-0409

Descriptors: *Speech recognition, *Computer applications, Analog to digital converters, Pitch discrimination, Waveforms, Parallel processing, Least squares method, Correlation techniques, Subroutines, Computerized simulation, FORTRAN.

A critical element of any low or medium bit rate (< 16 kbps) speech digitization system is the pitch extraction and voicing mechanism. Any digitization system in this low to medium bit rate region will require a good pitch extraction technique as a key part of the system. In this study previous pitch extraction techniques are reviewed in the light of current pitch extraction requirements for speech digitization. Two promising new pitch extraction algorithms are suggested: the multiband pitch period estimation technique and the skip-sample recursive least squares pitch position estimation technique. The former gives only spacings between pitch pulses, while the latter gives registration of the pitch pulses with the speech waveform.

AD-A012 344/8GA PC$4.25/MF$2.25
Naval Ordnance Lab White Oak Md
Design of Digital Modules for Signal Processing.
Final rept.,
B. J. Nordmann. 13 Aug 74, 54p Rept no. NOLTR-74-170

Descriptors: *Signal processing, *Modules(Electronics), Data transmission systems, Analog to digital converters, Digital to analog converters, Bus conductors, Integrated circuits, Multiprocessors, Time sharing, Fourier transformation.
Identifiers: Large scale integrated circuits, Fast Fourier transform.

This report describes the design considerations in the development of a family of Digital Signal Processing Modules for use in prototype development. It describes several of the modules in the family and then demonstrates their use in a variety of system configurations. The primary advantages foreseen in the use of such a family of modules lie in the fact that (1) less detailed work is necessary in developing a given prototype system thus speeding development time and (2) the repetitive use of the same modules in successive systems allows the use of techniques such as Large Scale Integration (LSI) which would not be justifiable by the small number of units needed for any single system.

AD-A012 352/1GA PC$3.75/MF$2.25
Transportation Systems Center Cambridge Mass
Transportation Systems Center/U.S. Coast Guard L-Band Maritime Satellite Test Program: Test Summary: September-November 1974.
Interim rept.,
C. B. Duncombe, P. D. Engels, A. E. Foley, J. H. Kraemer, and P. G. Mauro. Jun 75, 46p Rept no. TSC-USCG-75-1 USCG-D-104-75

Descriptors: *Satellite communications, Navigational aids, Navigation satellites, Voice communications, Communication satellites, Digital systems, Multipath transmission, Space to surface, Data reduction, Modems, L band.
Identifiers: ATS-6 satellite, DOT/4HZ/HD.

Several L-band satellite communications tests with the NASA ATS-6 spacecraft and the U.S. Coast Guard Cutter SHERMAN are described. The tests included 1200 bit per second digital data, voice, simultaneous data and voice, ranging, multipath and antenna tracking. Preliminary results are discussed.

AD-A012 406/5GA PC$3.75/MF$2.25
Bolt Beranek and Newman Inc Cambridge Mass
Word Verification in a Speech Understanding System.
Technical rept.,
Dennis H. Klatt. May 75, 43p Rept nos. BBN-3082, AI-29
Contract N00014-75-C-0533

Descriptors: *Speech recognition, *Word recognition, *Phonetics, Speech analysis, Words(Language), English language.
Identifiers: Word verification.

A word verification component of a speech understanding system is intended to give a reliable yes/no decision as to whether a hypothesized word is present at a particular region of the acoustic input. A verification stage is a desirable system component because spectrogram-reading experiments have shown that preliminary acoustic-phonetic analyses are inherently ambiguous, whereas all the detailed acoustic cues must be consistent with a particular work hypothesis or the hypothesis can be rejected in a straight-forward way. The author proposes a word verification strategy in which a synthesis by rule program is used to predict the acoustic characteristics of a given word. This analysis-by-synthesis paradigm facilitates the statement of what are essentially generative phonological and phonetic rules. Spectral matching criteria and dynamic time normalization procedures are proposed for determining whether the synthesis matches the acoustic input.

AD-A012 408/1GA PC$4.25/MF$2.25
Naval Postgraduate School Monterey Calif
Reduction of AUTODIN/NIDN Line Disciplines to Programmed Control Logic.
Master's thesis,
Jane F. Renninger. Jun 75, 68p

Descriptors: *Communications networks, *Data processing terminals, Message processing, Data transmission systems, Switching circuits, Synchronization(Electronics), Network flows, Theses, Ocean surveillance, Naval intelligence.
Identifiers: Computer networks, AUTODIN(AUTOmatic DIgital Network), Automatic digital network, NIDN(Navy Intelligence Data Network), Navy intelligence data network.

In this design of a backup control for the OSIS (Ocean Surveillance Information System) Communication processor, the AUTODIN/NIDN (Navy Intelligence Data Network) line disciplines were analyzed and reduced to programmed control logic. The method of approach was developed then applied to the AUTODIN/NIDN protocol. A definition of 'state', as

used in the context of the thesis, is presented, followed by detailed state transition tables and state diagrams. An instruction set of only three instructions was designed which can accomplish all the necessary tasks of the control logic. This instruction set was then used to program the Receive and Transmit control functions of the OSIS system. An implementation plan is presented to suggest possible ways the control unit can be made operational.

AD-A012 417/2GA PC$4.75/MF$2.25
Naval Postgraduate School Monterey Calif
Implementation and Testing of the NPS Data Communication Ring.
Master's thesis,
John S. Meserve, and Robert Stewart. Jun 75, 83p

Descriptors: *Communications networks, *Data transmission systems, *Data processing terminals, Time sharing, Read only memories, Microcomputers, Circuits, Interfaces, Theses.
Identifiers: *Computer networks.

The Naval Postgraduate School Ring Communication Network is a project which, when fully operational, will allow connection of designated computer facilities at the school. The capability provided to these facilities will be the transmission of data or messages to one another, which will allow sharing of resources. The main considerations in design of the network were modularity, to simplify construction and testing, and common hardware interfaces between the ring and each computer facility. To provide the capability to test all hardware/software functions test procedures were developed, and a hardware test module was constructed. The basic design of the ring network and test module is described. Test procedures and results are presented, as well as a proposal for a system modification, and recommendations concerning follow-on development of the system.

COM-75-10788/8GA PC$5.25/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
Requirements for an Air-Ground VHF Data Link for Air Traffic Control Applications.
Final rept.,
John P. Murray, and John J. Juroshek. Oct 74, 107p OTR-74-44
Contracts DOT/TSC-RA-74-10, DOT/TSC-RA-74-32
Paper copy also available from GPO.

Descriptors: *Air traffic control, *Data links, Telecommunication, Radio relay systems, Very high frequencies, Pulse communication, Digital systems, Voice communication.
Identifiers: *Air ground communications.

Requirements for a digital data-link to operate in the VHF aeronautical mobile band (108-136 MHz) are defined. Requirements are based on the needs of the Air Traffic Control system (ATC) through 1982. The system described is based on the Universal Data Link specified by the Radio Technical Commission on Aeronautics and on the standard prepared by ARINC. Requirements are based on air traffic forecasts, ATC plans, coverage needs, and capacity estimates based on allowable errors and waiting times.

COM-75-10815/9GA PC$4.25/MF$2.25
Office of Telecommunications, Boulder, Colo. Inst. for Telecommunication Sciences.
Computer Methods for the Objective Evaluation of Speech Communication Systems,
R. W. Hubbard, and J. A. Payne. Feb 74, 66p OTR-74-29
Sponsored in part by National Aeronautics and Space Administration, Greenbelt, Md. Goddard Space Flight Center. Paper copy also available from GPO.

Descriptors: *Voice communication, *Systems engineering, *Performance evaluation, Analog systems, Digital systems, Correlations, Indexes(Ratios), Computation, Computer aided evaluation, Telecommunication, Ratings, On line systems, Speech, Background noise, Terminology.
Identifiers: Articulation index, Subjectivity, Listener characteristics, Familiarity, Vocabulary, Objectivity, Speech intelligibility.

This report considers the articulation index (AI) as described by the American National Standards Institute as an objective method for evaluating the performance of voice communication systems. Several methods for automatically computing the AI from test data are presented. An on-line instrument known as the SCIM system is discussed, and methods to score AI data using general purpose computer programs are presented. The AI method is discussed regarding correlation subjective performance measures for analog and digital voice systems.

COM-75-10864/7GA PC$4.25/MF$2.25
Middleton (David), New York.
Statistical-Physical Models of Man-Made Radio Noise. Part I. First-Order Probability Models of the Instantaneous Amplitude,
David Middleton. Apr 74, 68p OTR-74-36
Contract COM-OT-0026
Paper copy also available from GPO.

Descriptors: *Communication theory, *Information theory, *Electromagnetic noise, *Statistical analysis, *Radiofrequency interference, Random noise, Probability density functions, Fourier transformation, Telecommunication.

A general statistical-physical model of man-made radio noise processes appearing in the input stages of a typical receiver is described analytically. This first report constitutes an initial step in a program to provide workable analytical models of the general nongaussian channel ubiquitous in practical communications applications. Specifically treated here are the important classes of interference with bandwidths comparable to (or less than) the effective aperture-RF-IF bandwidth of the receiver, the common situation in the case of communication interference.

N75-23652/1GA PC$4.25/MF$2.25
Hughes Aircraft Co., Culver City, Calif. Space and Communications Group.
Experiment Definition Phase Shuttle Laboratory Ldrl-10.6 Experiment.
Quarterly Report, 26 Sep. - 26 Dec. 1974.
15 Jan 75, 72p NASA-CR-143746, HAC-REF-D0824
Contract NAS5-200L8

Descriptors: *Ground-air-ground communications, *Molniya satellites, *Space laboratories, *Space shuttles, Data acquisition, Data links, Optical communication, Spaceborne telescopes, Weight reduction.

For abstract, see STAR 1315

N75-23653/9GA PC$5.25/MF$2.25
Delco Electronics, Santa Barbara, Calif.
Source Encoding for Orbiter Communications Links.
Final Report.
May 75, 116p NASA-CR-141792, R75-34
Contract NAS9-14402

Descriptors: *Coding, *Data links, *Data transmission, *Space shuttle orbiters, Data compression, Digital data, Telecommunication.

For abstract, see STAR 1315

N75-23655/4GA PC$5.25/MF$2.25
Communications Research Centre, Ottawa (Ontario).
Communications Experimenter'S Guide. Communications Technology Satellite.
R. W. Huck. Feb 75, 124p CRC-TN-671(CS-03-01)

Descriptors: *Communications technology satellite, *Telecommunication, Canada, Data links, Ground support systems, Information management, Navigation, Television transmission.

For abstract, see STAR 1315

N75-23820/4GA PC$4.25/MF$2.25
Linkabit Corp., San Diego, Calif.
Design of a Digital Voice Data Compression Technique for Orbiter Voice Channels.
Final Report.
28 Apr 75, 63p NASA-CR-141790, DLR-2
Contract NAS9-14415

Descriptors: *Channels (Data transmission), *Data compression, *Space shuttle orbiters, *Voice data processing, Analog simulation, Broadcasting, Digital techniques, Error correcting codes, Frequency modulation, Transmission efficiency.

For abstract, see STAR 1315

N75-24110/9GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Cost Competitiveness of a Solar Cell Array Power Source for Ats-6 Educational TV Terminal.
R. M. Masters. Apr 75, 9p NASA-TM-X-71720, E-8327

Descriptors: *Ats 6, *Educational television, *Solar arrays, Cost analysis, Fuel consumption, India, Ohio.

For abstract, see STAR 1315

N75-24384/0GA PC$3.25/MF$2.25
Royal Aircraft Establishment, Farnborough (England).
Employment of the Fast Fourier Transform in Digital Filters.
W. Schaller. Mar 75, 22p RAE-LIB-TRANS-1834, BR47431
Tran-Transl. Into English from Ntz (West Ger.), V. 27, No. 11, 1974 p 425-431.

Descriptors: *Digital filters, *Fourier transformation, Algorithms, Bandpass filters, Broadband, Data transmission, Frequency division multiplexing.

For abstract, see STAR 1315

PB-242 053/7GA PC$3.75/MF$2.25
National Inst. of Law Enforcement and Criminal Justice, Washington, D.C. Law Enforcement Standards Lab.
Voice Privacy Equipment for Law Enforcement Communication Systems. Law Enforcement Standards Program,
G. R. Sugar. May 74, 30p LESP-RPT-0204.00

Descriptors: *Speech scrambling, *Communication equipment, Police, Law enforcement, Standards, Voice communication, Reviews, Secure communication.

One of the ways to increase the privacy of communications is to use electronic devices that encode voice signals for transmission and decode them at the receiver. These devices, loosely referred to as 'scramblers', rearrange the voice signals so that, in principle, they are unintelligible to a listener who is not equipped

with the proper decoding equipment. This report first defines a set of special terms, then describes a number of types of scramblers that are now available for law enforcement use. Some inherent problems and weaknesses are discussed. The concepts of intelligibility and privacy are explored in detail. The potential contents of the standard are described, and some problems inherent in preparing and using the standard are discussed. The report concludes with some material intended to be of immediate assistance to the prospective purchaser of scramblers: a survey of units now on the market, some hints of how to proceed in the absence of a standard, and a bibliography of technical publications on voice scrambling.

PB-242 584/1GA PC$5.25/MF$2.25
Massachusetts General Hospital, Boston.
An Evaluation of the Teleconsultation System Elements.
Rept. for Mar 70-Jun 75,
Stanley Krainin, W. Scott Andrus, and Kenneth T. Bird. Jun 75, 110p
Contract EMI-74C-011-03

Descriptors: *Telecommunication, *Information systems, *Medical services, Television systems, Hospitals, Evaluation, Recommendations, Massachusetts, Systems analysis.
Identifiers: *Teleconsultation, Biomedical information systems, Veterans Administration hospitals, Health care delivery systems.

Teleconsultation, the telemedicine system linking the Veterans Administration Hospital, Bedford, Massachusetts General Hospital, Boston has logged over 400 transactions in a five-year operational period. The system is made up of eight subsystem groups, for video, program audio, data, diagnosis, control, transmission, support and testing. This report discusses every hardware element in the system, indicating its mode of operation, reliability, and utility for telemedicine. Typical block diagrams of key elements, and switching diagrams for video and program audio, are given. Whenever possible the medical need and associated technology are identified and the element appraised for its suitability in the system. The policy of beginning with a high quality basic system and letting demand suggest the final configuration has produced a system in which every element is a response to a felt need and is used. Recommendations, applicable by inference to any interactive television system, are made in the final section of this report.

PB-242 723/5GA PC$7.25/MF$2.25
RAND Corp., Santa Monica, Calif.
Concentration of Mass Media Ownership: Assessing the State of Current Knowledge,
Walter S. Baer, Henry Geller, Joseph A. Grundfest, and Karen B. Possner. Sep 74, 215p* R-1584-NSF NSF/RA/S-74-026
Grant NSF-GI-38358

Descriptors: *Mass media, *Ownership, *Management, Control, Reviews, Radio broadcasting, Television broadcasting, Newspaper publishing, Communication cables, Government policies, National government, Marketing, Demography, Competition, Economic factors, Impact.
Identifiers: State of the art.

This report deals with a study to assess the research literature and other writings which concern the ownership and control of radio, television, cable communications, and newspapers. The goals of the study were two fold: first to determine what factual evidence there was on the effects of media ownership and its relevance to present government policies; and second, to suggest what additional data and analysis are needed to strengthen the basis for future policy making. The authors find that prior studies seem flawed by inadequate data or by methodological problems. The size of a market, its demographic characteristics, and the number of local competitors would apear to be more important than ownership in influencing media economic performance and content.

PB-242 763/1GA
Mag Tape $160.00;Foreign $200.00
Federal Communications Commission, Washington, D.C. Data Automation Div.
Broadcast FM Data Base.
Data file,
Jack J. Sharkey. 1975, 1 reel mag tape FCC/DF-75/001
Specify tape recording mode desired: 9 track, 800 or 1600 bpi, odd parity, EBCDIC; or 7 track, 556 or 800 bpi, odd or even parity, BCD. Price includes documentation.

Descriptors: *Data file, *Radio broadcasting, Frequency modulation, Frequency allocations, Radio stations, Licenses, Regulations, National government, Magnetic tapes.

The Broadcast FM Data Base contains records for existing and proposed stations, allocations, and rulemaking petitions/proposals. The data base is converted from Honeywell system standard format, BCDIC, to EBCDIC, 1600 BPI, 9 track, odd parity tape, on the Honeywell H-6023. The data base contains approximately 7,100 records of 300 characters in length, 1 record per block.

PB-242 913/2GA PC$3.25/MF$2.25
Ohio State Univ., Columbus. Computer and Information Science Research Center.
Variable-Length Message Transmission for Distributed Loop Computer Networks (Part I).
Technical rept.,
C. C. Reames, and M. T. Liu. Jun 74, 14p OSU-CISRC-TR-74-2
Grants NSF-GN-534.1, NSF-GN-27458

Descriptors: *Data transmission, Switching circuits, Telecommunication, Interfaces.
Identifiers: *Computer networks, Message processing.

An introduction to loop networks is given, with a summary of previous accomplishments in this area. The problems involved in the transmission of variable-length messages are outlined, and the present technique is shown to be inadequate. An improved variable-length message transmission scheme is proposed for distributed loop computer networks, and a conceptual model is developed of its operation. The model illustrates a method by which the nodal interface can delay incoming messages by hardware buffering just long enough for an outgoing message to be placed on the loop; advantage is taken of gaps between messages to clear out the delay buffer and to make room for future outgoing messages. The effects of the proposed technique on message transmission are discussed, and future research is mentioned. An apendix provides some possible hardware realizations of the model.

17C. Direction Finding

PATENT-3 886 556 Not available NTIS
Department of the Air Force Washington D C
Multichannel Direction Finding Receiver System.
Patent,
Roderic V. Lowman. Filed 22 Apr 63, patented 27 May 75, 4p Rept nos. PAT-APPL-274 876,
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Direction finding, *Patents, Multichannel, Receivers.
Identifiers: PAT-CL-343-119.

The patent relates to a multichannel nonscanning direction finding system having a multiplicity of receiver channels and a single master channel generating a local oscillator signal for each receiver channel.

17D. Electromagnetic and Acoustic Countermeasures

AD-A012 202/8GA PC$4.75/MF$2.25
Army Aviation Engineering Flight Activity Edwards AFB Calif
HOT BRICK III Airworthiness Evaluation OV-1D Airplane.
Final rept.,
Donald F. Macpherson, Jr., and James S. Reid. Nov 74, 85p Rept no. USAAEFA-74-20

Descriptors: *Infrared countermeasures, *Observation aircraft, Acceptance tests, Flight testing, External stores, Fuel tanks, Flutter, Roll, Aerodynamic stability, Takeoff, Degradation, Stalling, Deficiencies, Performance(Engineering), Jettisonable equipment, Aerial reconnaissance, Weight, Low velocity, Handling, Airspeed, Experimental data, Multimode, Side looking radar, Level flight, Structural properties.
Identifiers: OV-1D aircraft, V-1 aircraft, HOT BRICK project, JP-4 fuel.

The United States Army Aviation Engineering Flight Activity conducted an airworthiness evaluation of the OV-1D (Mohawk) airplane modified with a HOT BRICK III infrared countermeasure device from 11 to 22 February 1974 at Fort Rucker, Alabama, and from 17 July to 7 August 1974 at Edwards Air Force Base, California. During the test program 20 productive hours were flown. Structural and handling qualities tests were conducted, with emphasis placed on the low-speed high gross weight regime. Structural testing was limited to flutter tests of the wing store that contained the 150-gallon fuel drop tank modified with the HOT BRICK III device, the wing at the HOT BRICK III store station, and the right wing tip. Handling qualities tests included a stall investigation, determination of control margins with high asymmetric loads, single-engine minimum trim and control airspeeds, and static lateral-directional stability. Other tests included takeoff performance and an airspeed system calibration. A large discrepancy existed between the takeoff performance data presented in the operator's manual and that obtained with the test aircraft.

17E. Infrared and Ultraviolet Detection

AD-A011 771/3GA PC$4.25/MF$2.25
Air Force Avionics Lab Wright-Patterson AFB Ohio
Gating and Contrast-Modulation Related to Active Covert Night Photo Systems.
Technical rept.,
Bruno K. Wernicke. May 75, 56p Rept no. AFAL-TR-74-212

Descriptors: *Night vision devices, *Photographic contrast, *Aerial photography, Gates(Circuits), Optical detection, Target acquisition, Night reconnaissance, Atmospheric scattering, Reflectance, Backscattering, Infrared detection, Modulation, Image intensification, Near infrared radiation.
Identifiers: *Atmospheric attenuation.

An investigation was made to compare the improvement of contrast modulation for different degrees of gated and non-gated Active Night Photo Systems. Illumination sources and sensor are near the same location. The effects of the atmospheric backscatter on the contrast modulation received by the imaging sensor was

determined in steps from a fully gated to a non-gated situation. Characteristic curves were derived for several flight altitudes from 2,000 to 23,000 feet and atmospheric conditions of meteorological visibility of 23 Km and 5 Km representing an upper and a lower limit for the most frequently occurring conditions. Specific regions where the contrast modulation decreases at higher rates are shown.

AD-A011 917/2GA PC$7.50/MF$2.25
General Research Corp Mclean Va
Space Object Laser Analysis - 2 (SOLA).
Final technical rept.,
G. F. Gurski, W. N. Peters, R. J. Radley, Jr., and N. H. Schultz. May 75, 244p Rept no. 49OW-01-CR RADC-TR-75-141
Contract F30602-74-C-0119

Descriptors: *Optical radar, *Space surveillance systems, *Infrared detection, Infrared signatures, Target signatures, Signal processing, Optical detectors, Optical tracking, Doppler radar, Identification systems, Space objects, Computer applications, Carbon dioxide lasers.
Identifiers: SOLA(Space Object Laser Analysis), Space Object Laser Analysis.

The object of this study was to definitize conceptual descriptions of laser radar functions identified during the original SOLA study. The work reported here is a compilation of analyses performed on individual study tasks including: quasi-resolved target effects, satellite laser radar cross-section modeling, signature effects on detection probability, CORAL (Coherent Optical Radar Laboratory) aquisition software, and multi-sensor SOI (Space Object Identification).

AD-A012 328/1GA PC$3.25/MF$2.25
Northeastern Univ Boston Mass Dept of Physics
High Pressure Far Infrared Spectroscopy of Ionic Solids,
R. P. Lowndes. 6 May 74, 7p ARO-10392.10-P
Grant DA-ARO-D-31-124-72-G125
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-22 n12 pt1 p1076-1080 Dec 74.

Descriptors: *Infrared spectroscopy, Far infrared radiation, High pressure, Solids, Gases, Argon, Phonons, Reprints.
Identifiers: Ionic solids.

A high pressure far infrared cell operating to truly hydrostatic pressures of 8 kbar is described and used to determine the anharmonic self-energies.

PAT-APPL-566 159/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Inverted Heterojunction Photodiode.
Patent Application,
Austin M. Andrews. Filed 8 Apr 75, 13p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Infrared detectors, *Photodiodes, Infrared lasers, Epitaxial growth, Semiconducting films, Lead compounds, Tin compounds, Tellurides, Heterodyning, Optical radar, Carbon dioxide lasers, Receivers, Cryogenics, Patents.
Identifiers: *Patent applications, PAT-CL-331-94-5, Lead tellurides, Tin tellurides, Heterojunctions.

The patent application describes an inverted heterojunction photodiode for use as a laser detector sensitive to the 8 - 14 micrometer portion of the infrared spectrum and operable above 77K. The diode structure comprises a PbTe substrate, a first buffer layer of Pb(.90)Sn(.10)Te material on said substrate and a second active layer of a Pb(.80)Sn(.20)Te material on said buffer layer. The first and second layers are grown by liquid phase epitaxy.

17G. Navigation and Guidance

AD-A011 777/0GA PC$10.00/MF$2.25
Honeywell Inc Minneapolis Minn
Cadmium Sulfide and Cadmium Selenide Star Detector Parametric Analysis.
Final rept. 2 May 72-31 Jan 75,
W. W. Doerffler, J. O. Boutelle, J. Jurisson, B. Gupta, and K. Tien. 31 Jan 75, 357p Rept no. F0137-FR1 SAMSO-TR-75-68
Contract F04701-72-C-0292

Descriptors: *Satellite attitude, *Photodetectors, *Optical detectors, Stars, Cadmium sulfides, Cadmium selenides, Photoconductors, Attitude control systems, Signal to noise ratio, Image processing, Parametric analysis, Celestial guidance, Computer programs.
Identifiers: *Star sensors, SPARS(Space Precision Attitude Reference System), Space Precision Attitude Reference System.

The parametric analysis of CdS and CdSe star detectors concentrates on functional relationships between detector performance and parameters such as materials properties, detector geometry, star image size and quality, total power of star light on the detector, star image transit rate, color temperature of the simulated star, and bias light. The parametric analysis was conducted to develop a better understanding of the detector performances as related to SPARS (Space Precision Attitude Reference System) and HAARS (High Altitude Attitude Reference System) requirements and, furthermore, to learn the entire operational ranges of CdS and CdSe star detector performances so that other related mission applications can benefit.

AD-A011 825/7GA PC$4.25/MF$2.25
Draper (Charles Stark) Lab Inc Cambridge Mass
Integration of the Ultraviolet Radiometer with the P72-2 Spacecraft.
Final rept.,
Juri Valge. Jun 75, 62p Rept no. R-863 SAMSO-TR-75-113
Contracts F04701-73-C-0402, F04701-70-C-0226

Descriptors: *Satellite tracking systems, *Ultraviolet radiation, Radiometers, Optical equipment, Data processing, Digital computers.
Identifiers: *Ultraviolet radiometers.

The ultraviolet radiometer (UVR) integration with the P72-2 spacecraft constituted the major effort on the program during this reporting period. The technical questions in the integration proceedings required most of the manpower, and it was found that a number of organizational interfaces were needed as well. The main goal of the ultraviolet radiometer on this test flight is proper data acquisition. A brief discussion is thought to be appropriate here, so that the reader can be introduced to the concepts involved and the integration effort can be viewed in proper perspective.

AD-A011 827/3GA PC$5.75/MF$2.25
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
NAVSAT/Loran-C Hybrid Aircraft Navigation System.
Technical memo.,
J. G. Wall, R. H. Bauer, M. O. Marshall, and P. C. Marth. Apr 75, 132p Rept no. APL/JHU-TG-1250
Contract N00017-72-C-4401

Descriptors: *Radio navigation, Hybrid systems, Doppler navigation, Loran, Navigation satellites, Aircraft, Systems engineering.
Identifiers: NAVSAT(Navy Navigation Satellite System), Navy navigation satellite system, Loran C navigation system.

A hybrid aircraft navigation system has been developed using Loran-C signals for continuous position location information, with periodic position updates from the Navy Navigation Satellite System (NAVSAT) to improve the accuracy of the system. Laboratory tests and flight tests have demonstrated the performance of the NAVSAT/Loran-C hybrid system and have established high confidence levels in its ability to provide accurate position location information, and to obtain in-flight local Loran-C grid calibration. This automatic system uses a Loran-C receiver, a NAVSAT receiver, a small computer, and associated display units to provide real-time readout of latitude and longitude.

AD-A012 072/5GA PC$3.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Guidance and Control Directorate
Fluidic Gyro Torquer.
Technical rept.,
Aubrey Rodgers, and Rayburn K. Widner. 22 Apr 75, 25p Rept no. RG-75-44

Descriptors: *Guided missiles, *Guidance, *Gyro stabilizers, *Torque converters, Fluidic amplifiers, Feedback amplifiers, Closed loop systems, Open loop systems.

The objective of this program is to develop fluidic torquer technology for missile guidance and control seeker type gyros. This report presents the technology in the development of a proportional/digital fluidic torquer and the associated electrofluid converter. The conceptual design feasibility and hardware performance characteristics are confirmed by the evaluation material. The cost-effectiveness of the torquer design is established by the use of off-the-shelf items and design simplicity. High-g survival and reliability requirements of the converter are verified by a 10,000-g cannon launch test environment. The study of the concept indicates that implementation of fluidic gyro torquing is feasible.

AD-A012 084/0GA PC$4.25/MF$2.25
Litton Systems Inc Woodland Hills Calif Guidance and Control Systems Div
A Transitional Design Study of the Position and Azimuth Determining System (PADS).
Final rept.,
William S. Weber. Jan 75, 71p Rept no. G/CSD-402 392 ETL-0001
Contract DAAK02-74-C-0193
See also AD-A012 085.

Descriptors: *Position finding, *Inertial measurement units, Modification, Pallets, Reliability(Electronics), Maintainability, Power supplies, Calibration.
Identifiers: PADS(Position and Azimuth Determining System), Position and azimuth determining system.

This report summarizes the results of a Position and Azimuth Determining System (PADS) transitional design study conducted to provide significant operational reliability, maintainability, and human factors engineering advancements over the prototype PADS. Included among the results of this effort are the elimination of the Velocity Reference Unit (VRU) used in the prototype PADS (thus reducing the prototype weight by more than 50 percent), a preliminary design of a PADS pallet, and a new power supply design which provides the PADS the added flexibility of full-time operation in an OH-58A Light Observation Helicopter. In addition, qualification tests were performed on the PADS unique 32-speed azimuth resolver, and the Inertial Measurement Unit (IMU) calibration equations were reviewed.

AD-A012 085/7GA PC$4.25/MF$2.25
Litton Systems Inc Woodland Hills Calif Guidance and Control Systems Div

A Study and Analysis of the Position and Azimuth Determining System (PADS) Field Maintenance Concept.
Final rept.,
William S. Weber. Dec 74, 74p Rept no. G/CSD-402 359 ETL-CR-74-22
Contract DAAK02-74-C-0193
See also AD-A012 084.

Descriptors: *Position finding, *Inertial measurement units, *Maintainability, Power supplies, Pallets, Logistics, Diagnostic equipment, Test equipment.
Identifiers: PADS(Position and Azimuth Determining System), Position and azimuth determining system.

The Position and Azimuth Determining System (PADS) maintenance concept is formulated on the use of automatic built-in test equipment (BITE) to analyze and verify system malfunctions at the organizational level. Upon verification of a system failure, direct or general support Contact Teams will make contact and use BITE to isolate the malfunction to a line replaceable unit (LRU). The malfunctioning LRU is then returned to the general support maintenance level for repair. A special test equipment (STE) configuration employing an automatic software diagnostic program technique is then used to isolate LRU malfunctions to the replaceable module level, and to verify LRU operation after replacement of the faulty module. This combination of BITE and STE diagnostics offers cost-effectivity, minimal operator skill requirements, and a tactically feasible solution to maintaining the PADS in a field Army environment.

AD-A012 107/9GA PC$4.75/MF$2.25
Mitre Corp Mclean Va
ATC Performance Requirements for Developing Prototype Versions of the Discrete Address Beacon System.
Apr 73, 76p Rept no. MTR-6321 FAA-EM-73-6
Contract DOT-FA70WA-2448

Descriptors: *Air traffic control systems, Beacons, Performance(Engineering), Data links, Surveillance, Requirements, California.
Identifiers: DABS(Discrete Address Beacon Systems), *Discrete address beacon systems, DOT/4IZ/ID, Los Angeles Basin.

The requirements for the Discrete Address Beacon System (DABS), which is to support the Air Traffic Control System through the 1990's are enumerated. The requirements presented in this paper should be used in developing the prototype versions of DABS. Data link requirements have been developed for several categories of messages. The first category is tactical (numeric), which are essential for air traffic control. Some of these messages are used to support such ATC services as: parallel-approach monitoring, improved metering and spacing, intermittent positive control and en-route monitoring. The second category is called tactical (symbolic), messages that are short alphanumeric messages which are directly related to ATC. Some of these messages are changes in area navigation waypoints, coded routes and holding instructions. The third category is called record messages. These messages are longer symbolic messages which can have a direct ATC connection (e.g., clearances) or messages which are ATC related but not considered essential to an ATC data link (e.g., in flight weather information about the aircraft's destination, etc.).

AD-A012 222/6GA PC$4.25/MF$2.25
Transportation Systems Center Cambridge Mass
Maritime Dynamic Traffic Generator. Volume II: Electronic Data Processing Program.
Final rept. Jan 72-Jun 73,
Franklin D. MacKenzie. Jun 75, 56p Rept nos. TSC-OST-74-20.II, TSC-USCG-74-7-II USCG-CG-D-37.75-II
See also Volume 1, AD-A012 221.

Descriptors: *Marine transportation, *Surface navigation, *Satellite communications, Merchant vessels, Global communication systems, Communications networks, Position finding, Data processing, Casualties.
Identifiers: DOT/4IZ/ID, DOT/4DZ/DD.

The processor program is designed to move 18,000 merchant vessels along standard routes to their destination and keep statistical records of the ports visited, the five degree squares passed through and the occurrence of casualties. This document presents detail information on the design of the Maritime Dynamic Traffic Generator, the subroutines, the reasoning behind each routine; and how they are related. In addition, there are descriptions of the data preparations and editing the input data used in the generation.

AD-A012 248/1GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
An Advanced Balloon Locating System,
H. Laping, and A. R. Griffin. 3 Jun 75, 14p Rept no. AFCRL-TR-75-0312

Descriptors: *Position finding, *Balloons, Tracking, Very high frequency, Omnidirectional, Radio ranges, Networks, Radio stations, Ground stations, Airborne, Radio receivers, Radio beacons.
Identifiers: *VOR navigation.

A third generation balloon locating instrument using VHF Omnidirectional Range (VOR) navigation has been designed, developed and flight tested by AFCRL's Aerospace Instrumentation Laboratory. The report that follows will lead into a discussion of this new instrument after first presenting VOR theory and its use in locating a balloon position. (Author)

AD-A012 359/6GA PC$7.50/MF$2.25
Intermetrics Inc Cambridge Mass
Error Source Recovery from INS Test Flight Data.
Final technical rept.,
Peter A. Grundy. 14 Jul 75, 228p Rept no. IR-122-1 AFSWC-TR-75-49
Contract F29601-75-C-0016

Descriptors: *Inertial navigation, *Flight testing, Navigational aids, Errors, Kalman filtering, Regression analysis, Data processing, Computer programming.

The CIRIS system at Holloman Air Force Base provides a highly precise reference for the flight testing of navigation systems. This report explores the recovery of the significant sources of error of an inertial navigation system under test through optimal filter techniques, using CIRIS data as reference information. A Kalman filter modelling all the significant sources of error for the test INS and the CIRIS INS and precision ranging system, is executed over a set of selected flight test profiles. The estimation of individual sources of error is shown to be inhibited by correlation of the contributions of error sources to the measured quantities. Highly correlated error sources are then lumped into linear combinations, and the reduced error model Kalman filter is executed over the test profiles.

AD-A012 398/4GA PC$5.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Network Management.
Project rept.,
H. F. Vandevenne. 16 May 75, 103p Rept no. ATC-45 FAA-RD-75-8
Contract DOT-FA72WAI-261

Descriptors: *Air traffic control systems, *Radar beacons, *Communications networks, Management, Transponders, Decision making, Message processing.
Identifiers: DOT/4IZ/ID, DAB(Discrete Address Beacon Systems), Discrete address beacon systems.

This report provides a discussion of the design of the DABS network management function. Network management is responsible for the interaction between the local sensor and the adjacent connected sensors. Based on a dynamic interpretation of the coverage map and the status of the network, network management determines (a) the coverage responsibility of the local sensor, (b) which other sensors are covering the same area, and (c) which of the sensors has principal data link responsibility. Interaction is effected through message exchange over ground communication links connecting the DABS sensors.

N75-23543/2GA PC$4.25/MF$2.25
Analytical Mechanics Associates, Inc., Mountain View, Calif.
A Kalman Filter for the Stoland System.
S. F. Schmidt. Apr 75, 67p NASA-CR-137668, REPT-75-10
Contract NAS2-8503

Descriptors: *Kalman filters, *Navigation aids, *Short takeoff aircraft, Airborne/spaceborne computers, Aircraft equipment, Aircraft landing, Logic design, Navigation instruments.

For abstract, see STAR 1315

N75-23544/0GA PC$3.25/MF$2.25
United Air Lines, Inc., Denver, Colo.
Implications of Equipping a DC-8-61 Fleet with Rnav/Two-Segment Approach Avionics.
E. B. Anderson. Feb 75, 14p NASA-CR-137680
Contract NAS2-7475

Descriptors: *Aircraft landing, *Analog computers, *Area navigation, *Cost effectiveness, Airborne/spaceborne computers, Avionics, Dc 8 aircraft, Instrument landing systems.

For abstract, see STAR 1315

N75-23549/9GA PC$5.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Four-Dimensional Guidance Algorithms for Aircraft in an Air Traffic Control Environment.
T. Pecsvaradi. Mar 75, 140p NASA-TN-D-7829, A-5530

Descriptors: *Air traffic control, *Aircraft guidance, *Algorithms, *Automatic flight control, *Flight paths, Flight paths, In-flight monitoring, Navigation aids, Tracking (Position).

For abstract, see STAR 1315

N75-23629/9GA PC$4.75/MF$2.25
Intermetrics, Inc., Cambridge, Mass.
Post-Test Navigation Data Analysis Techniques for the Shuttle Alt.
Final Report.
15 Apr 75, 96p NASA-CR-141789, IR-109-75
Contract NAS9-13902

Descriptors: *Approach control, *Data processing, *Postflight analysis, *Space navigation, *Space shuttles, Flight simulation, Flight tests, Landing, Spacecraft performance.

For abstract, see STAR 1315

N75-23636/4GA PC$5.75/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Graphics of Space Mechanics Analytical-Graphical Methods in Space Navigation.
G. A. Yazvitskiy. May 75, 126p NASA-TT-F-16298
Contract NASW-2481
Tran-Transl. Into English of the Book "Kosmicheskaya Grafomekhanika" Moscow, Mashinostroyeniye Press, 1975 128 p.

Descriptors: *Gert, *Space mechanics, *Space navigation, Flight tests, Nomographs, Orbital mechanics, Problem solving, Space flight, Trajectory analysis.

For abstract, see STAR 1315

N75-23654/7GA PC$8.50/MF$2.25
Analytic Sciences Corp., Reading, Mass.
Space Shuttle Entry and Landing Navigation Analysis.
Final Report.
H. L. Jones, and B. S. Crawford. 31 Jul 74, 251p NASA-CR-141765, TR-302-2
Contract NAS9-12968

Descriptors: *Atmospheric entry, *Inertial navigation, *Landing aids, *Space shuttles, Error analysis, Kalman-schmidt filtering.

For abstract, see STAR 1315

N75-23925/1GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
A Steering Law for Three Double-Gimbal Control Moment Gyro Systems.
T. Yoshikawa. Mar 75, 34p NASA-TM-X-64926

Descriptors: *Control moment gyroscopes, *Gimbals, *Steering, Aerodynamic configurations, Digital simulation, Problem solving, Torque.

For abstract, see STAR 1315

N75-23931/9GA PC$3.75/MF$2.25
Bendix Corp., Teterboro, N.J. Guidance Systems Div.
Hydrostatic Fluid Bearing Gyro.
Final Report.
E. Y. Brello. Mar 75, 31p NASA-CR-120753
Contract NAS8-24414

Descriptors: *Fluid rotor gyroscopes, *Hydrostatics, *Temperature control, Equipment specifications, Heaters, Product development, Temperature gradients, Temperature sensors.

For abstract, see STAR 1315

17H. Optical Detection

AD-A011 940/4GA PC$7.25/MF$2.25
E-Systems Inc Greenville Tex Greenville Div
TRAP MATS Canopy Modification Acceptance Test Report and Appendix A Thru M.
Test rept. Dec 72-May 74,
David J. McPherson. Nov 74, 221p Rept no. G8484.16.23 SAMSO-TR-75-105
Contract F04701-71-C-0013
See also report dated Nov 74, AD-A011 941.

Descriptors: *Optical tracking, *Radiometers, *Canopies, Cryogenics, Cooling, Flight testing, Acceptance tests.
Identifiers: TRAP program, MATS program, *Cryogenic cooling.

This document details the results of Acceptance Tests conducted on the TRAP MATS Canopy Modification under Contract F04701-71-C-0013. The body of this report contains a summary of the entire acceptance test program. Details of each individual test are included as appendices. Table 1-1 contains a list of tests conducted and Table 1-2 contains a matrix showing CEI Specification and results.

AD-A011 941/2GA PC$11.25/MF$2.25
E-Systems Inc Greenville Tex Greenville Div
TRAP MATS Canopy Modification Acceptance Test Report. Appendix N. Flight Acceptance Test, Drum Resonance.
Test rept. Dec 72-May 74,
David J. McPherson. Nov 74, 442p Rept no. G8484.16.23-App. N SAMSO-TR-75-105-App-N
Contract F04701-71-C-0013
See also report dated Nov 74, AD-A011 940.

Descriptors: *Optical tracking, *Radiometers, *Canopies, Cryogenics, Cooling, Flight testing, Acceptance tests.
Identifiers: TRAP program, MATS program, *Cryogenic cooling.

This is the Acceptance Test Report for the TRAP MATS Canopy Modification Program under Contract F04701-71-C-0013 to the U. S. Air Force Space and Missile Organization. The TRAP MATS Canopy Modification Program concerns itself primarily with the development and testing of revolving open aperture drums and a cryogenic cooling system for a state of art radiometric sensor system. This report documents the results of the acceptance tests.

AD-A012 259/8GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park
Detection Statistics for Laser Radar in Atmospheric Turbulence with Fluctuating Targets,
Gerard Lachs, and Mark C. Miner. 25 Jul 74, 5p ARO-11758.1-EL
Contract DAHC04-73-C-0036
Availability: Pub. in IEEE Transactions on Aerospace and electronic Systems, vAES-11 n2 p234-237 Mar 75.

Descriptors: *Optical radar, *Lasers, Detection, Probability, Background radiation, Atmospheric motion, Turbulence, Targets, Oscillation, Reprints.

The probability of detection and false-alarm rates are developed for laser radar systems perturbed by background radiation, fluctuating targets, and atmospheric turbulence. In particular, some results on the decibel loss due to atmospheric turbulence are presented. (Author)

N75-23936/8GA PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Its-K Infrared Cryogenic Telescope-Spectrometer Aboard Salyut-4.
N. Zheleznov, Y. Golovanov, A. Pokrovskiy, B. Konovalov, and V. Golovachev. May 75, 24p NASA-TT-F-16355
NASA ORDER W-13183
Tran-Transl. Into English from Various Russian Articles.

Descriptors: *Cryogenic equipment, *Infrared spectroscopy, *Spectroscopic telescopes, *U.s.s.r. space program, Earth atmosphere, Infrared radiation, Infrared spectra, Magellanic clouds, Refrigerating machinery, X rays.

For abstract, see STAR 1315

17I. Radar Detection

AD-A011 776/2GA PC$3.75/MF$2.25
Hughes Aircraft Co Fullerton Calif Ground Systems Group
Missile Site Radar (MSR) - Upgrading Program. Volume IV. Acoustic Velocity Correlator.
Final technical rept. 1 Sep 73-28 Feb 74,
R. C. Knittle, and T. W. Bristol. Apr 75, 33p Rept no. FR-73-14-788 RADC-TR-73-347-Vol-4
Contract F30602-71-C-0138
Sponsored in part by Ballistic Missile Defense Advanced Technology Center, Huntsville Ala.

Descriptors: *Correlators, *Radar equipment, *Signal processing, Acoustic waves, Surface waves, Transducers, Antimissile defense systems, Acoustic velocity, Guided missile tracking systems.
Identifiers: Acoustic surface waves.

The object of the program is to determine the feasibility of implementing the velocity correlator network of a Pulse Burst Processor System using acoustic surface waves. The acoustic velocity correlator is a network of multiple tapped delay lines which corrects the Doppler time shifts of the output signals from a pulse burst correlator tapped delay line and sums the corrected signals in a single Doppler velocity channel. A 20 MHz bandwidth prototype device was developed during the first phase of the program. The goal of the current phase is to produce a 50 MHz design with improved performance. This report describes the development of improved velocity correlator equivalent circuit models which will be used to design the broadband prototypes. The accuracy of the models is validated by comparison on computed and measured data from the 20 MHz prototype device.

AD-A011 831/5GA PC$6.25/MF$2.25
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Digital Simulation of a Synthetic Aperture Radar.
Technical memo.,
A. D. Goldfinger. Mar 75, 159p Rept no. APL/JHU-TG-1272
Contract N00017-72-C-4401

Descriptors: *Synthetic aperture radar, Digital simulation, Scientific satellites, Computer programming, Ocean surface, Ocean waves.
Identifiers: SEASAT-A satellite.

To evaluate a synthetic aperture radar being designed for the SEASAT-A satellite a digital simulation was undertaken. A system operating in spotlight mode with step-chirp pulse compression was modeled. A bottleneck analysis of the software led to an economical implementation of this model. The ocean scattering model used assumed Rayleigh statistics. Ocean surface models representing chaotic seas and deterministic patterns, such at sea ice and oil slicks, were viewed by the radar. The effects of single-bit quantization of the signal, data thinning by random deletion of the signal, and coherent breakup of the image were investigated. Analytic models of image degradation owing to single-bit processing and image spectral distortion that is due to coherent breakup were developed and found to be consistent with the results of the simulation.

AD-A012 267/1GA PC$4.25/MF$2.25
Kansas Univ/Center for Research Inc Lawrence Remote Sensing Lab
Simulation of a Radar Image for Garden City Test Site.
Technical rept.,
S. K. Parashar, A. K. Fung, and R. K. Moore. Feb 75, 59p Rept no. RSL-TR-234-8 ETL-0007
Contract DAAK02-73-C-0106

Descriptors: *Radar images, *Digital simulation, Images, Image processing, Radar targets, Side looking radar, Terrain intelligence, K band, Computer programs.
Identifiers: Garden City(Kansas), AN/APQ-97.

This report documents and demonstrates in detail the procedure to be followed in digitally simulating a radar image for Garden City test

site. The type of information needed for simulation and the method of actual construction of the image are presented. Simulated images both with and without fading are included. These images are produced for system parameters corresponding to Westinghouse AN/APQ-97 radar system. The simulated image is compared with the actual radar image of the area. The simulation of images for Garden City represents a first simulation effort for comparatively simple scene using relatively few system parameters.

JPRS-64930 PC$3.25/MF$2.25
Joint Publications Research Service, Arlington, Va.
Influence of Long Waves on Energy Spectra of Radio Signals Scattered by the Sea Surface,
I. A. Leikin, I. E. Ostrovskii, A. D. Rozenberg, V. G. Ruskevich, and I. M. Fuks. 6 Jun 75, 17p Trans. of Izvestiya Vysshikh Uchebnykh Zavedenii. Radiofizika (USSR) n3 p346-357 1975.

Descriptors: *Radar signals, *Electromagnetic scattering, Ocean waves, Energy, Spectra, Translations, USSR.
Identifiers: Ocean surface, Radar reflections.

The report contains an investigation of a fine structure of radar signals scattered by the sea surface at small slip angles. A model is suggested for the scattering surface which permits an explanation of the observed frequency shifts of radio signals of different polarizations in the framework of the resonance scattering theory.

17J. Seismic Detection

AD-A011 695/4GA PC$3.25/MF$2.25
Boston Coll Chestnut Hill Mass
Integration of Geokinetic Data Acquisition System into Two Mobile Vans.
Interim rept. 1 Nov 72-30 Oct 73,
John G. Hogan. Apr 73, 14p Rept no. Scientific-1 AFCRL-TR-73-0739
Contract F19628-72-C-0013

Descriptors: *Seismic detection, *Data acquisition, Trailers, Seismological stations, Shock resistance, Data processing, Mobile.
Identifiers: PDP 11/20 computers.

The installation of the Geokinetic Data Acquisition System in two mobile vans is described. Key design parameters are presented. Mounting requirements, power and cooling requirements are detailed. Equipment locations in the vans are shown.

AD-A011 703/6GA PC$6.25/MF$2.25
Boston Coll Chestnut Hill Mass
Evaluation of Seismic Instrumentation and Analysis of Seismic Data.
Final rept. 1 Nov 72-30 Jun 74,
John G. Hogan, Car Syverson, Joseph I. Blaney, Jr., and Howard W. Kuenzler. Jan 75, 172p Rept no. Scientific-1 AFCRL-TR-75-0081
Contract F19628-72-C-0013

Descriptors: *Seismic detection, *Data processing, *Seismic data, Data acquisition, Analog to digital converters, Central processing units, Logic circuits, Telemetering transmitters, Computer programming, Guided missile launchers.
Identifiers: PDP 11/20 computers.

The Geokinetic Data Acquisition and Analysis System is described. Both the computer operating system and the general signal conditioning electronics are detailed. Special purpose programs required to support the collection and analysis of both geokinetic and inertial data generated in and around a Minuteman test silo area are presented. Special instrumentation and interfaces required to collect and analyze data from the Hill Air Force Base Experimental Test Facility are described.

AD-A011 731/7GA PC$3.75/MF$2.25
Pattern Analysis and Recognition Corp Rome N Y
Buried Line Sensor - Winter Test Program 1973 - 1974. Software Documentation.
Final technical rept.,
Donald H. Foley, Joseph Wing-Fat Wong, and Dennis D. White. May 75, 41p RADC-TR-75-132
Contract F30602-74-C-0122

Descriptors: *Seismic detection, *Data processing, *Analog to digital converters, Computer programming, Waveforms, Instruction manuals.

This report describes the Analog-to-Digital conversion routines used for creating the hard-copy Library from the data collected during the Winter Test Program for Buried Line Sensors. These A/D routines created the digital data in a format compatible with the Waveform Processing System (WPS) available at RADC. The WPS was then used to annotate the data and produce hardcopies.

AD-A011 849/7GA PC$8.75/MF$2.25
Texas Instruments Inc Dallas Equipment Group
An Evaluation of Adaptive-Beamforming Techniques Applied to Recorded Seismic Data.
Technical rept.,
Thomas E. Barnard, and Leo J. O'Brien. 31 Dec 74, 289p Rept no. TI-ALEX(01)-TR-74-08
Contract F08606-74-C-0033, ARPA Order-2551

Descriptors: *Seismological stations, *Underground explosions, *Seismic detection, Seismic data, Beam forming, Signal processing, Seismometers, Multichannel, Seismic arrays, Background noise, Earthquakes, Nuclear explosions, Signal to noise ratio, Alaska, Korea, Adaptive systems.
Identifiers: Vela Uniform, Alaskan long period array, Korean short period array, Adaptive filters.

This report presents time-domain maximum likelihood adaptive beamforming results for data from the Alaska Long-Period Array and the Korean Short-Period Array. Adaptive-beamforming detection gain relative to beamsteering is investigated for unmixed long-period seismic events in the presence of background noise and for simulated mixed events where two data samples, each containing a signal, are summed to create a composite sample containing an interfering event. In the adaptive beamforming studies for background noise, the performance of two different adaptive algorithms, the effect of using closely-spaced partial arrays instead of the full ALPA array, and the effect of different frequency filters applied to the input channels before array beamforming are examined. In the interfering-event analysis, the relative on-azimuth to off-azimuth event strength at which an on-azimuth event detection is possible determines the detection gain of adaptive multichannel filtering over time-shift-and-sum beamforming.

AD-A012 296/0GA PC$4.25/MF$2.25
Texas Instruments Inc Dallas Equipment Group
Maximum Likelihood Estimation of Seismic Event Magnitude from Network Data.
Technical rept. no. 1,
Frode Ringdal. 27 Mar 75, 70p Rept no. TI-ALEX(01)-TR-75-01
Contract F08606-75-C-0029, ARPA Order-2551

Descriptors: *Seismic arrays, *Seismic detection, *Underground explosions, Earthquakes, Seismometers, Nuclear explosions, Intensity, Seismological stations, Mathematical models, Statistical analysis, Norway.
Identifiers: Vela Uniform, Norwegian seismic array, Maximum likelihood estimation, Very long period seismometers, World wide standard seismograph network.

Seismic networks often tend to overestimate the magnitude of earthquakes, because those stations within the network that do not detect a particular event are ignored in the conventional magnitude averaging procedure. By assuming a normal distribution of world-wide magnitudes for any given event, it is possible to establish a simple statistical model that includes the additional information that the event magnitude at nondetecting stations must be below a certain threshold value. In this report, maximum likelihood estimation is applied to determine event magnitude based on this model. The advantages and limitations of the technique are discussed using both simulated and real data.

AD-A012 297/8GA PC$4.75/MF$2.25
Texas Instruments Inc Dallas Equipment Group
Comparison of Coherent and Incoherent Beamforming Envelope Detectors for NORSAR Regional Seismic Events.
Technical rept. no. 6,
Wen- Wu Shen. 31 Dec 74, 82p Rept no. TI-ALEX(01)-TR-74-06
Contract F08606-74-C-0033, ARPA Order-2551

Descriptors: *Seismic detection, *Seismic arrays, *Underground explosions, Signal processing, Earthquakes, Nuclear explosions, Detectors, Seismometers, Performance(Engineering), Seismological stations, Beam forming, Norway, Integral transforms, Fourier transformation.
Identifiers: Vela Uniform, Norwegian seismic array, Short period seismometers, Hilbert transformation.

The performance of the conventional coherent beam envelope detector and the incoherent beam envelope detector were studied and compared using short-period Norwegian Seismic Array (NORSAR) data from regional earthquakes and presumed explosions. The detectors were evaluated in two frequency bands in terms of detection performance, false alarm characteristic, and the resultant operating characteristic. A detector using the envelope of the array beam computed with the Hilbert transform was also examined.

AD-A012 306/7GA PC$3.75/MF$2.25
Teledyne Geotech Garland Tex
Operation of the Tonto Forest Seismological Observatory.
Quarterly rept. no. 6, 1 Jan-31 Mar 75.
7 May 75, 26p Rept no. TR-75-3
Contract F08606-74-C-0007
See also report dated 7 Feb 75, AD-A009 826.

Descriptors: *Seismological stations, *Underground explosions, *Seismic detection, Seismometers, Operation, Earthquakes, Nuclear explosions, Seismic data, Maintenance, Seismographs, Data processing, Arizona, Texas.
Identifiers: Vela Uniform, Tonto Forest Seismological observatory, Payson(Arizona), Garland(Texas).

The report describes the operation, evaluation, and improvement of the Tonto Forest Seismological Observatory (TFSO), located near Payson, Arizona, the research and test functions carried out at the TFSO, and the research tasks performed by the Geotech staff in Garland, Texas, using TFSO data.

18. NUCLEAR SCIENCES AND TECHNOLOGY

18B. Isotopes

PB-243 215/1GA PC$7.25/MF$2.25
Sandia Labs., Albuquerque, N. Mex.
Gas Dynamic Problems in Isotope Separation.
Final rept.,
K. J. Touryan, E. P. Muntz, L. Talbot, and E. Von Halle. Mar 75, 83p SAND-75-0121
Contract AT(29-1)-789, Grant NSF-ENG75-05424

Descriptors: *Isotope separation, *Gas dynamics, *Meetings, Aerodynamics, Nozzles, Jet flow, Membranes, Molecular beams.
Identifiers: *Aerodynamic isotope separation.

A synopsis is given of the presentations and discussions held at a workshop on the gas dynamic problems inherent in aerodynamic isotope separation devices. Five principal aerodynamic devices are considered in some detail. These are: (1) the curved separation nozzle; (2) the opposing jet scheme; (3) the separation probe scheme; (4) the jet membrane device; and (5) the crossed-beam device.

18C. Nuclear Explosions

AD-A011 812/5GA PC$4.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Nuclear Shock Wave Propagation through Air Entrainment Systems of Hardened Facilities.
Final rept. Nov 73-May 74,
R. H. Fashbaugh, A. Widawsky, and D. Pal. Apr 75, 56p Rept no. CEL-TR-820

Descriptors: *Underground structures, *Hardened structures, *Blast waves, Nuclear explosion damage, Wave propagation, Shock waves, Ducts, Attenuation, Finite difference theory, Computerized simulation, Partial differential equations, Computer programming.
Identifiers: Hyperbolic differential equations.

An analytical study was undertaken to develop the capability of predicting nuclear shock wave propagation through air entrainment systems of hardened facilities. All solutions presented in this report are one-dimensional. Two finite-difference schemes for approximately the hyperbolic partial differential equations of fluid dynamics are used: the pseudo-viscosity scheme in a variable area Lagrange formulation, and the Lax-Wendroff two-step scheme in an Eulerian formulation. Shock wave attenuation due to viscous losses at ducting walls is included. A comparison of the results of the analysis with shock tube experimental data shows both formulations to be adequate.

18D. Nuclear Instrumentation

AD-A011 821/6GA PC$3.25/MF$2.25
Armed Forces Radiobiology Research Inst Bethesda Md
The Fraction of Collected Charge Carried by Unattached Electrons in Small, Air-Filled Ionization Chambers,
D. W. Shosa. Feb 75, 17p Rept no. AFRRI-TN75-1

Descriptors: *Ionization chambers, *Charge carriers, Space charge, Ion density.

An analysis has been performed of the fraction of negative charge carried by electrons in small, air-filled ionization chambers with parallel-plate, cylindrical and spherical geometries. For chambers whose gap widths are on the order of millimeters, filled to a pressure of about 1 atmosphere, and with applied polarizing voltages of several hundred volts, it is found that nearly all of the collected negative charge carriers are unattached electrons.

N75-23922/9GA PC$8.75/MF$2.25
New Hampshire Univ., Durham. Dept. of Physics.
Solar gamma Ray Monitor for OSO-H (0.3-10 Mev).
Final Report.
E. L. Chupp, I. U. Gleske, and D. J. Forrest. Dec 74, 278p NASA-CR-143799
Contract NAS5-11054

Descriptors: *Gamma rays, *Oso-7, *Radiation detectors, *Solar radiation, Data processing, Equipment specifications, Performance tests, Power supplies, Solar flux.

For abstract, see STAR 1315

18I. Reactor Engineering and Operation

AD-A012 148/3GA PC$4.75/MF$2.25
Army Engineer Power Group Fort Belvoir Va Engineering Div
Thermal Hydraulic Analysis of MH-1A Core 5.
Final rept.,
Henry C. Gignilliat, Peter E. Francisco, Thomas M. Rotchford, and Randal M. DeVault. 1 May 74, 79p Rept no. USAENPG-ED-7401

Descriptors: *Reactor cores, Transient radiation effects, Nucleate boiling, Reactor coolants, Reactor accidents.
Identifiers: *Power reactors(Nuclear), *MH-1A reactor, *Offshore nuclear power plants, Loss of coolant.

This report presents the thermal hydraulic analysis of Core 5 for the MH-1A Floating Barge Nuclear Power Plant. The primary purpose of this study is to demonstrate that the reactor core is capable of meeting normal steady-state and transient performance requirements without violating the integrity of the fuel-element cladding. The analyses presented herein define the limits of safe operation for the core in terms of measurable reactor parameters: Reactor power, primary system pressure, coolant temperature and flow. The reactor protection system is designed to trip the reactor to protect the core in the event that reactor parameters approach the core design limits. The steady-state thermal analysis shows that the prescribed setpoints with allowance for error assure protection during all normal operations. The analysis of limiting reactor transients caused by operator error or equipment malfunction demonstrates the adequacy of the protection system in assuring that core limits are not exceeded during anticipated transient conditions.

19. ORDNANCE

19A. Ammunition, Explosives, and Pyrotechnics

AD-A011 804/2GA PC$6.25/MF$2.25
Battelle Columbus Labs Ohio
A Study of Equipment, Processes, and Systems for a Demilitarization Facility at Naval Ammunition Depot, Hawthorne, Nevada. Phase I. Information Gathering and Plan Generation.
Final rept.,
R. W. Bennett, B. C. Kim, G. G. Zeidman, R. B. Landrigan, and P. M. Penn. 31 Jan 75, 168p
Contract N62474-74-C-3913

Descriptors: *Naval shore facilities, *Explosive ordnance disposal, Ordnance disposal tools, Demilitarization, Facilities, Ordnance, Processing, Nevada.
Identifiers: Hawthorne(Nevada).

The objective of the overall E/P/S (Equipment/Processes/Systems) program being carried out by Western Division NAVFAC is to provide the new facility being built at NAD Hawthorne with equipment suitable for demilitarizing a wide variety of ammunition items safely and economically.

AD-A011 807/5GA PC$4.25/MF$2.25
Civil Engineering Lab (Navy) Port Hueneme Calif
Effects of Charge Shape and Composition on Blast Environment.
Final rept. Mar 72-Sep 74,
J. E. Tancreto. May 75, 62p Rept no. CEL-TN-1390

Descriptors: *Ammunition, *Storage, Industrial production, Safety, Explosives, Surface burst, Slurry explosives, Geometric forms.

Blast pressures were obtained from surface bursts of hemispherical, spherical, and cylindrical composition B explosive and from encased RDX slurry charges. Charge weights varied from 0.50 to 3.7 pounds. Pressure measurements, taken between 2 and 50 feet from the charge, varied from less than 1 psi to over 1,000 psi. The pressure-time records were evaluated for peak pressure, impulse, and positive-phase duration. The effects of charge shape and composition were of primary importance, but surface hardness and slight charge elevation effects were also investigated. Peak-pressure and peak-scaled unit impulse equivalencies (by weight of TNT hemispherical surface bursts) are calculated for composition B spheres and cylinders and for the RDX slurry charges. Test results indicate that the blast environment from composition B depends more on the shape of the charge than on its chemical difference from the TNT standard. The composition B equivalencies determined in this study might be more properly labeled as shape factors which could be applied to any high explosive.

AD-A011 845/5GA PC$37.50/MF$37.50
Picatinny Arsenal Dover N J
Encyclopedia of Explosives and Related Items. Volume 6.
Technical rept.,
Basil T. Fedoroff, and Oliver E. Sheffield. 1974, 839p Rept no. PA-TR-2700-Vol-6
Library of Congress catalog card no. 61-61759. See also Volume 5, AD-768 063.
Availability: Available to non-U.S. Addresses PC$40.00, MF$40.00.

Descriptors: *Explosives, *Encyclopedias, Explosive charges, Propellants, Projectiles, Ammunition, Fuzes(Ordnance), Combustion, Chemical compounds, Electrostatic fields.

The report is the sixth volume of a continuing effort to comprehensively cover unclassified information on explosives and related subjects. The subject material is presented alphabetically and the entries are supported by references.

AD-A012 075/8GA PC$3.25/MF$2.25
Naval Intelligence Support Center Washington D C Translation Div
Mines - A Formidable Naval Weapon (Miny - Groznoe Oruzhie Flota),
I. Chernyshev. 20 May 75, 8p Rept no. NISC-Trans-3669
Trans. of Voennye Znaniya (USSR) n12 p41-42 1972.

Descriptors: *Naval mines, Magnetic mines, Influence mines, Aerial mines, Minelayers,

Minelaying equipment, Mine detectors, Translations, USSR.

The brief article reviews the properties of Russian naval mines, mine operations, mine countermeasures and mine warfare.

19C. Combat Vehicles

AD-A011 848/9GA PC$7.25/MF$2.25
Institute for Defense Analyses Arlington Va Science and Technology Div
Survey of Advanced Propulsion Systems for Surface Vehicles.
Final rept. Oct 73-Dec 74,
Frederick R. Riddell. Jan 75, 206p Rept no. P-1073 IDA/HQ-74-16706
Contract DAHC15-73-C-0200

Descriptors: *Military vehicles, *Propulsion systems, Energy storage, Energy transfer, Vehicles, Ships, Submarines, Advanced systems.
Identifiers: *Land vehicles, *Sea vehicles.

Future military needs in propulsion systems for surfaces vehicles are examined in order to provide guidance for Technology Base programs directed at improved engines, transmissions, thrusters and fuels. It is observed that there is a physical tendency for power-generating systems to grow heavier per horsepower as output increases. This trend runs counter to the requirements of more mobile vehicles which need more power for less weight. These effects are quantified and it is shown that the performance demands of many projected military surface vehicles severely restrict the propulsion system options that technology can provide.

19D. Explosions, Ballistics, and Armor

AD-A011 774/7GA PC$4.25/MF$2.25
General Electric Co Philadelphia Pa Space Div
Infrared Vidicon Observations of Exploding Balloon Events.
Final technical rept. Apr 74-Feb 75,
F. Alyea, and R. Gulatsi. May 75, 68p RADC-TR-75-139
Contract F30602-74-C-0049, ARPA Order-1649
See also AD-780 030.

Descriptors: *Balloons, *Explosive gases, *Infrared signatures, Explosion bubbles, Explosions, Airburst, Infrared scanning, Infrared optical systems, Vidicons, Detonations, Methane, Oxygen.
Identifiers: GEST project.

The Air Force Weapons Laboratory conducted a series of experiments as part of Project GEST (Gas Explosive Simulation Technique) to evaluate the flow characteristics of fireballs resulting from balloon explosions. A primary diagnostic for these events was an infrared vidicon sensor system operated by the General Electric Company, Space Sciences Laboratory (GE-SSL) under the sponsorship of the Defense Advanced Research Projects Agency (DARPA). This report presents the results of these diagnostic experiments.

AD-A011 778/8GA PC$4.25/MF$2.25
Arizona Univ Tucson Dept of Chemical Engineering
Ignition of HE Charges by a Gap Compression Mechanism.
Final rept. 1 Jan 74-30 Jun 75,
Alan D. Randolph. 30 Jun 75, 56p AFOSR-TR-75-0826
Contract F44620-70-C-0088
See also report dated 28 Feb 74, AD-783 296.

Descriptors: *High explosives, *Compression ignition, Sensitivity, Heating, Compression, Ignition, Detonations, Computerized simulation.
Identifiers: NEWGAP model.

Work was completed on development, implementation and documentation of a numerical simulator, Program NEWGAP, which models the thermal ignition of condensed-phase HE subjected to sudden compression of an adjoining planar gap. The model predicts HE ignition (implying initiation) with the values of thermal, thermo-kinetic physical properties and gap sizes characteristic of accidential ignitions in defective encased HE systems. The NEWGAP model was modified as a four-phase composite system to represent insertion of a thin inert foil at the gas/HE interface. The program was then used by the principle investigator at Los Alamos scientific Laboratory to analyze TNT ignition data in the aquarium low-shock gas compression ignition test. This data analysis was supported at LASL under a DARPA contract. Program NEWGAP successfully model these TNT ignition data. A publication describing the NEWGAP model, theoretical initiation predictions, and the TNT data was written and submitted for publication.

AD-A012 065/9GA PC$13.00/MF$2.25
Army Engineer Waterways Experiment Station Livermore Calif Explosive Excavation Research Lab
One-Dimensional Analyses: Shock Wave Propagation from Underwater Cratering Detonations.
Final rept.,
Charles M. Snell. Jan 75, 566p Rept no. WES-MP-E-75-1

Descriptors: *Underwater explosions, *Cratering, Excavation, Detonation waves, Shock waves, Wave propagation, Hydrodynamic codes, Rock mechanics.

Research has recently been conducted on the use of large buried chemical explosive charges for engineering excavation. Investigations in this area were initially concerned with crater formation in relatively homogeneous rock media, a process which is now well understood. However, it has become apparent that the greatest cost and operational advantages may be realized by applying the technique to rock excavation in an underwater environment. Cratering dynamics in an underwater (two-layer) configuration have not been well understood. Small-scale modeling tests and large-scale excavation projects have revealed two new factors which significantly influence underwater cratering processes: (1) early-time dynamic effects caused by the presence of the rock-water interface and water layer; and (2) very late-time water washback and slope failure effects in the crater vicinity. The report addresses the first of these two effects by means of hydrodynamic computer calculations.

AD-A012 207/7GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Synthesis and Ballistic Evaluation of Selected Transparent Polyurethane Block Copolymers, Part II. Further Changes in Formulation.
Final rept.,
Anthony F. Wilde, Richard W. Matton, Joseph M. Rogers, and Stanley E. Wentworth. Mar 75, 18p Rept no. AMMRC-TR-75-6
See also report dated Dec 73, AD-773 689.

Descriptors: *Polyurethane resins, *Armor, *Ballistic testing, Block copolymers, Mechanical properties, Chemical composition, Hardness, Performance(Engineering), Transparent panels, Molding techniques.
Identifiers: Diisocyanates.

In an extension of previous work on polyurethane block copolymers for transparent armor applications, several additional variations of the basic 2,4-toluene diisocyanate/polytetramethylene oxide/1,4-butanediol formulation have been investigated. It has been found that excess diisocyanate in a given formulation improves ballistic resistance and that decreasing the amount of polyether (soft segment) has the same effect. More generally, it has been found that increased sample hardness (Shore D) parallels improved ballistic performance. High-speed photographic data have shown that these materials continue to absorb large amounts of ballistic energy, with relatively little of this energy manifested as fragment kinetic energy. A technique for the preparation of void-free ballistic test specimens involving the use of a polytetrafluoroethylene mold is also described.

AD-A012 268/9GA PC$4.25/MF$2.25
Southwest Research Inst San Antonio Tex
Simultaneous and Running Impulsive Loading of Cylindrical Shells.
Final rept.,
Roger L. Bessey, and J. C. Hokanson. Jun 75, 74p Rept no. SwRI-02-3358 BRL-CR-237
Contract DAAD05-72-C-0229

Descriptors: *Shells(Structural forms), *Impulse loading, Explosion effects, Deformation, Fracture(Mechanics), Damage assessment, Cylindrical bodies.
Identifiers: *Cylindrical shells.

Impulsive loading was performed on silica phenolic-bond and bare aluminum and lead cylindrical shells in the fixed-end configuration. The shells were loaded with 180 degree circumferential cosine loading distributions using stripped sheet explosive or spray-deposited silver acetylide-silver nitrate explosive. Values for the peak specific impulse needed to produce minimum lethality damage to the structures (wall displacements on the order of a radius) were obtained for the four different types of structures. The dependence of these values on the simultaneity of initiation and type of 'running' load (i.e., longitudinal or circumferential) was ascertained for the structures where the overlap in the loading value between the sheet and sprayed explosive load required to produce lethality damage made it possible.

N75-23634/9GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Fortran Program for Calculating the Trajectory of Projectiles.
N. Gylden, and A. Johnson. May 75, 21p NASA-TT-F-16316
Contract NASW-2481
Tran-Transl. Into English from Swedish Report Foa-2-a-2564-D8, Dec. 1972 20 p.

Descriptors: *Computer programs, *Fortran, *Trajectory analysis, Numerical analysis, Trajectory measurement.

For abstract, see STAR 1315

N75-24009/3GA PC$4.25/MF$2.25
Institut Franco-Allemand de Recherches, St. Louis (France).
Efficiency of Steel Fragments on Thin Duralumin Targets Efficacite des Eclats d'Acier sur des Cibles Minces de Duralumin.
G. Herbette, F. Jamet, and J. P. Hancy. 26 Mar 74, 61p ISL-12/74
Contract CEG-403/058/22
Language in French.

Descriptors: *Hypervelocity projectiles, *Projectile cratering, *Steels, Hypervelocity impact, Light gas guns, Metal plates, Terminal ballistics, Thin plates, Velocity measurement.

For abstract, see STAR 1315

19E. Fire Control and Bombing Systems

AD-A012 312/5GA PC$4.25/MF$2.25
Iowa Univ Iowa City Div of Information Engineering
Optimal Control of a Helicopter Turret Control System.
Technical rept. May 74-Jan 75,
N. K. Loh. Jan 75, 69p RIA-R-TR-75-019
Contract DAHC04-72-A-0001

Descriptors: *Helicopters, *Gun turrets, Servomechanisms, Optimization, Control systems, Feedback, Linear systems, Computer programs, Gunships.
Identifiers: M-97 gun turrets, XM-97 gun turrets.

The optimal control of a XM-97 helicopter turret control system is considered. An optimal tracking controller using a quadratic performance index has been developed for the turret. The step responses of both the optimal turret and the existing turret (designed under the classical servomechanism technique) are studied by numerical simulations. It is found that the optimal controller performs much more satisfactorily than the existing controller.

AD-A012 366/1GA PC$4.25/MF$2.25
Naval Surface Weapons Center Dahlgren Lab Va
A Mathematical Model for Digital Gunfire Control Using Numerical Integration.
Technical rept.,
G. P. Burns, and L. G. Stout, Jr. Mar 75, 65p
Rept no. NSWC/DL-TR-3282

Descriptors: *Naval vessels, *Gun mounts, *Fire control systems, Mathematical models, Fire control computers, Ship motion, Ballistic trajectories, Computer programs, Numerical integration.
Identifiers: Mark 42 gun mounts(5-in.).

A mathematical model developed for digital gunfire control using the NSWC/DL effective drag functions was modified. the NSWC/DL functions were replaced with fourth-order Rungs-Kutta numerical integration of particle trajectory equations for calculation of gun elevation angle, projectile deflection, and projectile time of flight. Projectile drag coefficient is obtained during the integration process by table look-up of prestored values. The sequence of computations is given for the present position, prediction, ballistics and gun order sections of the model. The current version of the modified model was designed not for use in a gunfire control system but as a tool for evaluation of gunfire control models.

19F. Guns

AD-A012 237/4GA PC$5.75/MF$2.25
Rock Island Arsenal Ill General Thomas J Rodman Lab
Rotating Band Torques and Stresses on AMCAWS 30mm Copper Banded Projectiles.
Final rept.,
Michael R. Kane. May 75, 144p Rept no. RIA-R-TR-75-022

Descriptors: *Gun barrels, *Interior ballistics, Rotating bands, Torque, Stresses, Rifling, Firing tests(Ordnance), Computer programs, FORTRAN.
Identifiers: 30-MM projectiles, FORTRAN 4 programming language.

This report details the study effort and testing conducted to design a more optimum rifling profile for the Advanced Medium Caliber Aircraft Weapon System (AMCAWS 30MM) ammunition. Several critical parameters such as bearing stress and torque have been identified and their importance to the ultimate survivability of the band assessed. These critical parameters have been incorporated into a preliminary model to predict the success or failure of a given band and barrel combination.

AD-A012 368/7GA PC$4.25/MF$2.25
Naval Ordnance Station Louisville Ky
Feasibility Study of Cyclic Pressure Testing Thick-Walled Cylinders.
Final rept. on Phase 1.
Jan 75, 62p Rept no. NOSL-MT-026

Descriptors: *Gun barrels, *Fatigue life, Test equipment, Fatigue tests(Mechanics), Cyclic tests, Pressure, Cracks, Ultrasonic inspection.

This study was initiated to investigate the feasibility of cyclic pressure testing thick-walled cylinders using electrohydraulic energy. The primary intended end use is an economical means of cyclic loading Naval Gun Barrels to safely determine their fatigue life. Preliminary examination was conducted on sample sections of a 5-inch gun barrel to verify design of end restraints, parabolic shaper, and reflector. Energy levels of 42 and 52 kilojoules (8,000 and 10,000 volts) were used, and pressures in the order of 40,000 to 68,000 psi were generated. From this data, further tests were conducted with an electrohydraulic equipment manufacturer to examine rapid cycling and pressure measuring equipment. The results obtained substantiate the use of the technique for cyclic pressure testing; however, it is considered that additional work is needed to design and produce more reliable components to optimize the process.

19G. Rockets

AD-A012 150/9GA PC$5.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Ground Equipment/Materials Directorate
Development of the Filament-Wound Composite Launch Tubes for SMAWT Program.
Technical rept.,
G. A. Clodfelter. 31 Mar 75, 115p Rept no. RL-75-8

Descriptors: *Antitank weapons, *Rocket launchers, Tube launched, Filament wound construction, Reinforced plastics, Glass fibers, Hydrostatic pressure, Shoulder launched weapons.
Identifiers: SMAWT program, *Fiberglass reinforced plastics.

This reported effort is directed toward the analysis, design, and fabrication of an inexpensive, disposable, lightweight, filament-wound tube suitable for use as a man-portable, shoulder-fired missile launcher. As a launch tube of this nature is generally meant to offer protection for the missile in addition to its function as a missile launcher, two completely different sets of design parameters are involved.

20. PHYSICS

20A. Acoustics

AD-A011 781/2GA PC$3.25/MF$2.25
Wisconsin Univ Milwaukee Dept of Physics
Ultrasonic Attenuation in the Mixed State of Vanadium,
J. Waynert, H. Salvo, Jr., and M. Levy. 17 Jan 74, 8p AFOSR-TR-75-0762
Grant AF-AFOSR-2079-71
Availability: Pub. in Physical Review B, v10 n5 p1895-1864, 1 Sep 74.

Descriptors: *Vanadium, Ultrasonic radiation, Attenuation, Electrons, Phonons, Interactions, Superconductors, Single crystals, Electrical resistivity, Transverse waves, Electrical resistivity, Reprints.
Identifiers: Longitudinal waves.

The ultrasonic attenuation coefficient has been measured in the mixed state of a vanadium single crystal with a resistivity ratio of 20 using both longitudinal waves at 135 Mc/sec and transverse waves at 255 Mc/sec propagating along the (110) direction and parallel to the applied magnetic field. Good quantitative agreement is found with the theory of Houghton and Maki which predicts that close to the upper critical field the attenuation coefficient should depend linearly upon the applied magnetic field but that slightly below the upper critical field the attenuation should vary as the square root of the difference between the upper critical field and the applied field. Close to the upper critical field the superconductor is in a gapless state and the attenuation should be proportional to the number of normal like electrons. These are linearly dependent upon the magnetization which gives the linear dependence between the attenuation and the applied field. Slightly below the upper critical field the attenuation depends upon the spatial average of the order parameter, and this depends upon the square root of the magnetization which then gives the observed dependence upon the applied magnetic field. (Author)

AD-A011 782/0GA PC$3.25/MF$2.25
Wisconsin Univ Milwaukee Dept of Physics
Effects of Superconducting Fluctuations on the Ultrasonic Attenuation in a Thin Aluminum Film,
D. Robinson, K. Maki, and M. Levy. 5 Dec 73, 6p AFOSR-TR-75-0764
Grant AF-AFOSR-2079-71
Availability: Pub. in Physical Review Letters, v32 n13 p709-712, 1 Apr 74.

Descriptors: *Ultrasonic radiation, *Acoustic attenuation, *Metal films, *Superconductivity, Thin films, Aluminum, Surface waves, Transition temperature, Variations, Reprints.

A unique technique is described for measuring the ultrasonic attenuation coefficient in very thin inhomogeneous films whose thickness is of the order of 300 A. It is demonstrated that in a film which is composed of aluminum islands about 50 A in diameter embedded in an Al2O3 matrix it is possible to measure the ultrasonic attenuation coefficient that is produced by electron phonon interaction in the aluminum islands. Surface waves at 2000Mc/sec are used for these measurements. The Al film was deposited between two sets of interdigital fingers on a lithium niobate substrate. One set was used as the transmitter of the surface waves and the other as the receiver. The measurements on the Al film showed that fluctuations did not contribute to the attenuation of the surface waves near the critical temperature while they did contribute to the electrical resistivity. This may be due to the fact that electrical current is free to seek whatever superconducting path is available and thus fluctuations contribute significantly to a reduction in the resistivity while ultrasonic waves must travel through the whole material and since fluctuations only occupy a small volume of the material, they do not contribute to the ultrasonic attenuation. (Author)

AD-A011 789/5GA PC$3.25/MF$2.25
Delaware Univ Newark Dept of Mathematics
Acoustic Scattering by Penetrable Homogeneous Objects,
R. Kittappa, and R. E. Kleinman. 20 Mar 74, 14p AFOSR-TR-75-0886
Grant AF-AFOSR-2634-74
Availability: Pub. in Jnl. of Mathematical Physics, v16 n2 p421-432 Feb 75.

Descriptors: *Acoustic waves, Scattering, Lyapunov functions, Integral equations, Iterations, Reprints.
Identifiers: Helmitoltz equation, Neumann series.

The scattered field is found when a time harmonic acoustic wave is incident upon a finite object characterized by a density and wavenumber different from that of the surrounding medium. The interface is assumed to be either Lyapunoff or piecewise Lyapunoff. The problem is cast as a pair of coupled surface integral equations for the total field and its normal derivative on the interface. The Neumann series obtained by straightforward iteration is proven to be convergent for ranges of density and wavenumber, and specific bounds on these ranges are given. For small enough wavenumbers, the series converges for all values of the interior density. The iteration appears simpler than the usual Born approximation, which involves volume as well as surface integrals. The method is illustrated in the case of a spherical interface. (Author)

AD-A011 836/4GA PC$3.25/MF$2.25
Texas Univ At Austin Applied Research Labs
Summary of Environmental Acoustic Data Processing.
Final rept. 1 Sep-31 Dec 73,
Glen E. Ellis. 18 Jun 75, 25p Rept no. ARL-TR-75-32
Contract N00014-70-A-0166

Descriptors: *Underwater sound, *Data processing, Continuous waves, Signal processing, Hydrophones, Noise, Spectrum analysis.
Identifiers: CDC 3200 computers.

This report summarizes the tasks performed under the contract during the period 1 September through 31 December 1973. Descriptions of the continuous wave (cw), ambient noise, and explosive source (SUS) processing systems developed and implemented are provided. The use of these processing systems for the 'quick-look' analyses and volume data processing for the CHURCH GABBRO Exercise is described.

AD-A011 953/7GA PC$3.25/MF$2.25
Southern Methodist Univ Dallas Tex Dallas Geophysical Lab
Naturally Occurring Atmospheric Acoustical Signals,
John A. McDonald. 29 Feb 72, 15p AFOSR-TR-74-1891
Contract F44620-71-C-0073
Availability: Pub. in Jnl. of the Acoustical Society of America, v56 n2 p338-351 Aug 74.

Descriptors: *Acoustic signals, Atmospheres, Sources, Storms, Hurricanes, Tornadoes, Infrasonics, Microbarometric waves, Reprints.

Atmospheric disturbances located close to microbarograph arrays in north Texas are assumed to be caused by sources of acoustic-gravity waves and/or infrasound. The sources studied are large storms, hurricanes, tornadoes, and frontal systems. The large-amplitude long-period acoustic-gravity waves are readily found, but detection of infrasound presents problems which are indicated and some possible solutions are suggested. (Author)

AD-A012 015/4GA PC$3.25/MF$2.25
Toronto Univ (Ontario) Inst for Aerospace Studies
Suppression of Refraction in Jet Noise by Cooling.
Technical note,
J. T. Kelsall. May 75, 23p Rept no. UTIAS-TN-194 AFOSR-TR-75-0908
Grant AF-AFOSR-1885-70
Also pub. as ISSN-0082-5263.

Descriptors: *Aerodynamic noise, *Jet flow, *Noise reduction, *Cooling, Suppression, Refraction, Air flow, Velocity, Temperature gradients, Canada, Cancellation, Convection, Acoustic fields, Liquid nitrogen, Cryogenics.
Identifiers: Velocity gradients, Jet noise, Aeroacoustics.

Noise generation in an air jet can be described in terms of a convection factor. The velocity gradients in the flow refract the sound, giving rise to a commonly observed final directivity. In the experiments outlined here the effects of convection and refraction on directivity are examined for a jet of very cold air. An attempt is made to determine whether any interdependence between convection and refraction can be detected experimentally in narrow band jet noise data. In the reported investigation liquid nitrogen was used to cool a jet of air (at nozzle speeds 0.21 to 0.28 of ambient sound speed) down to temperatures (between -110C and -155C) at which the refraction from the opposed velocity and temperature gradients produced cancellation effects.

AD-A012 060/0GA PC$3.25/MF$2.25
Delaware Univ Newark Dept of Mathematics
Direct and Inverse Problems in Obstacle Scattering for Application in Detection, Identification and Communication.
Scientific interim rept. Jan 74-Jan 75,
John S. Asvestas, and Ralph E. Kleinman. Feb 75, 8p AFOSR-TR-75-0881
Grant AF-AFOSR-2634-74

Descriptors: *Acoustic scattering, *Electromagnetic scattering, Integral equations, Tensor analysis.
Identifiers: Inverse problems.

This report summarizes the work carried out during the period January 1, 1974, to January 1, 1975. Work during this period was directed along three lines: Further development of regularized integral equations; use of polarizability tensors in low frequency scattering; and, integral representations of electromagnetic fields in the presence of open surfaces.

AD-A012 090/7GA PC$7.00/MF$2.25
Advisory Group for Aerospace Research and Development Paris (France)
Aircraft Noise Generation, Emission and Reduction.
Lecture series.
Jun 75, 187p Rept no. AGARD-LS-77
Presented in Belgium 16-17 Jun 75, West Germany 19-20 Jun 75, and in the United Kingdom 23-24 Jun 75. NATO furnished.

Descriptors: *Jet aircraft, *Aircraft noise, Jet engine noise, Propeller noise, Sonic boom, Noise reduction, Physiological effects, Legislation, NATO.
Identifiers: *Noise sources, *Noise abatement.

The physical properties of aircraft noise are summarized, with special emphasis on jet noise and fan-compressor-propeller-rotor noise. Topics include acoustic fundamentals, noise source characteristics and interactions, atmospheric propagation, airframe noise, sonic boom, duct liner and muffler theory. During the series, research and technology activities related to jet engine noise and its control are discussed, and the impact of this noise on people and communities and aircraft operational procedures for noise minimisation are also reviewed.

AD-A012 160/8GA PC$3.75/MF$2.25
Human Engineering Lab Aberdeen Proving Ground Md
Design Standards for Noise: A Review of the Background and Bases of MIL-STD-1474(MI).
Final rept.,
Georges R. Garinther, David C. Hodge, Gerald Chaikin, and Donald M. Rosenberg. Mar 75, 47p Rept no. HEL-TM-12-75

Descriptors: *Noise(Sound), *Acoustic measurement, *Human factors engineering, Physiological effects, Environmental engineering, Engine noise, Machinery noise, Standards, Army equipment.
Identifiers: *Noise levels, *Military standards, *Design standards.

U.S. Army Human Engineering Laboratory (HEL) Standard S-1-63C (September 1972) was the first design standard for noise in which all previous conflicts between U.S. Army medical guidelines and materiel design criteria were resolved. Its lineal descendent, MIL-STD-1474(MI) (March 1973), was the first design standard for noise in which all Army review activities concurred. This report treats the historical background of Army noise standards, the bases for the noise-limit provisions of MIL-STD-1474(MI), and considerations underlying the specified noise measurement procedures. Appendixes credit the many personnel involved, and an extensive list of references is provided.

JPRS-64817 PC$3.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
Signal Selection and Transmission,
I. I. Gnatovskii. 21 May 75, 42p
Trans. of Otbor i Peredacha Informatsii (USSR) n22 p61-68 1969, n23 p90-92, n24 p46-49, p130-135, n25 p109-113, p122-126 1970.

Descriptors: *Underwater acoustics, *Radio transmission, *Bandpass filters, *Direction finding, Underwater sound equipment, Recording, Transformations, Interfaces, Air water interactions, Translations, USSR.

Contents:
- Reflection of a plane sound wave from a thin elastic infinite plate in a fluid;
- Hydroacoustic vibration transmitter;
- Estimation of the real-time spectrum of a loop recording;
- One class of selective transformations;
- The error in determining the velocity vector of moving objects in two-point direction finding by the Doppler effect;
- Choice of a circuit of low-frequency third octave band-pass filters in consideration of their transient time;
- The effect of the 'water-air' interface on the transmission of AM and FM signals.

N75-23564/8GA PC$3.75/MF$2.25
Defence and Civil Inst. of Environmental Medicine, Downsview (Ontario). Behavioural Sciences Div.
Cf5d Aircraft Cockpit-Noise Reduction.
S. E. Forshaw, and S. W. Olsen. Sep 74, 39p DCIEM-74-R-1048

Descriptors: *Aircraft noise, *Cockpits, *Noise reduction, Air conditioning equipment, Mufflers.

For abstract, see STAR 1315

N75-23569/7GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Full Scale Upper Surface Blown Flap Noise.
L. J. Heidelberg, L. Homyak, and W. L. Jones. 1975, 28p NASA-TM-X-71708, E-8322
Conf-Presented at the Natl. Air Transportation Meeting, Hartford, Conn., 6-8 May 1975; Sponsored by the Soc. Of Automotive Engr.

Descriptors: *Flaps (Control surfaces), *Jet engines, *Noise (Sound), Aerodynamic configurations, Trailing edges.

For abstract, see STAR 1315

N75-23611/7GA PC$4.75/MF$2.25
Massachusetts Inst. of Tech., Cambridge. Fluid Dynamics Research Lab.
The Development of Experimental Techniques for the Study of Helicopter Rotor Noise.
Final Report, Jun. 1973 - Nov. 1974.
S. E. Widnall, W. L. Harris, Y. C. A. Lee, and H. M. Drees. Nov 74, 89p NASA-CR-137684
Contract NAS2-7684
Subm-Sponsored in Part by Army Air Mobility R and D Lab., Moffett Field, Calif.

Descriptors: *Aircraft noise, *Helicopters, *Noise pollution, *Rotary wings, Calibrating, Noise reduction, Wind tunnels.

For abstract, see STAR 1315

N75-23821/2GA PC$4.25/MF$2.25
Communications Research Centre, Ottawa (Ontario).
Proceedings of the Canadian Workshop on Acoustic Surface Waves.
D. B. Wohlberg, and G. W. Farnell. Jun 74, 59p CRC-R-1260
Subm-Sponsored by Dept. Of National Defence. Conf-Conf. Held in Ottawa, 30-31 Jan. 1974.

Descriptors: *Signal processing, *Sound waves, *Surface waves, *Wave propagation, Bandpass filters, Digital transducers, Equipment specifications, Noise generators, Pulse compression.

For abstract, see STAR 1315

20B. Crystallography

AD-A011 751/5GA PC$3.25/MF$2.25
Sperry Research Center Sudbury Mass
The Effect of Germanium on the Distribution Coefficient of Aluminum in the System Solid Al sub x Ga sub 1-x As Liquid Ga-Al-As-Ge,
H. T. Minden, R. Premo, and C. V. Collins. 25 Mar 74, 5p AFCRL-TR-75-0329
Availability: Pub. in Jnl. of Crystal Growth, 27 p316-319 1974.

Descriptors: *Gallium arsenides, *Germanium, *Aluminum, Epitaxial growth, Crystals, Layers, Doping, Liquids, Distribution, Reprints.

Epitaxial aluminum gallium arsenide mixed crystal layers were grown from germanium doped gallium solution. Electron beam probe analysis revealed that the distribution coefficient of aluminum between the solid and the liquid phases is lowered by the presence of relatvely large concentrations of germanium in the liquid solution. (Author)

AD-A012 059/2GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Electrical Engineering
Comparison of Photovoltaic and Photoconductive Effects in Insulating Cds Crystals,
Technical rept.,
Bernard Kramer, John T. Wallmark, and Peter Mark. 25 Nov 74, 10p Rept no. TR-27
Contract N00014-75-C-0394
Availability: Pub. in Jnl. of Vacuum Science and Technology, v12 n3 p713-720 May/Jun 75.

Descriptors: *Photovoltaic effect, *Photoconductivity, *Band theory of solids, Transients, Cadmium sulfides, Single crystals, Electrical insulation, Semiconductors, Oxygen, Controlled atmospheres, Surface properties, Reprints.
Identifiers: Insulating crystals, Surface states, Light to dark ratio, Dember voltage.

Photovoltage measurements with insulating CdS crystals capacitively coupled to the external circuit have been performed at room temperature in 1 atm oxygen and 10 to the 8th power Torr vacuum, and at 100 K at 10 to the 8th power Torr vacuum, and have been interpreted self consistently with photoconductivity measurements. It was found that the Dember voltage is about 0.06 V at room temperature and 0.02 V at 100 K, that the oxygen chemisorption-induced surface barrier is at least 0.15 eV at room temperature, and that photoconductivity measurements are a valuable tool in the self-consistent interpretation of photovoltage measurements on an insulating specimen. (Author)

AD-A012 126/9GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park Dept of Physics
Introductory Remarks on Polaritons and Surface Polaritons-Electromagnetic Waves at Interfaces.
Technical rept.,
E. Burstein, A. Hartstein, J. Schoenwald, A. A. Maradudin, and D. L. Mills. 1972, 26p Rept no. TR-57
Availability: Pub. in Proceedings of Taormina Conference on Polaritons, 26p.

Descriptors: *Crystal lattices, *Electromagnetic radiation, *Polartrons, Maxwells equations, Magnetic moments, Interfaces, Wave propagation, Electromagnetic fields, Wave equations, Quantum theory, Oscillation, Equations of motion, Dielectric properties, Dipole moments, Optical properties, Reprints.
Identifiers: *Polaritons, Interface waves, Fano modes, Zenneck modes, Prism coupling, Grating coupling, Brewster angle.

The macroscopic dispersion relations and the linear optical properties of Brewster, Fano, and Zenneck modes at the interface of semi-infinite media are formulated in a unified manner in terms of the dielectric constants and magnetic permeabilities of the interfacing media. The microscopic dispersion relations are obtained by introducing the expressions for the dielectric constants and magnetic permeabilities of the two media in terms of the mode properties of the electric dipole and magnetic dipole excitations of the media. The nature of the interface EM modes which occur in two-interface (slab) configurations are discussed with particular emphasis on the Fano modes which occur in symmetrical and asymmetrical two-interface configurations. Finally, the linear coupling of surface polaritons and bulk polaritons at gratings (i.e., grating coupling) and in the asymmetrical two-interface configuration (i.e., prism coupling) and their use in determining the dispersion curves of surface polaritons is discussed. (Author)

AD-A012 186/3GA PC$3.25/MF$2.25
Colorado Univ Boulder Dept of Mechanical Engineering
On the Interaction of Cleavage Cracks with Second Phase Particles,
Norman Ahlquist. 29 Apr 74, 7p AFOSR-TR-75-0798
Grant AF-AFOSR-2603-74
Abstract in French and German.
Availability: Pub. in Acta Metallurgica, v23 p239-243 Feb 75.

Descriptors: *Magnesium oxides, *Lithium fluorides, *Cracks, *Interactions, *Particles, Crack propagation, Strength(Mechanics), Fracture(Mechanics), Thermal shock, Resistance, Reprints.

The interaction of (100) cleavage cracks with hard and soft second phase particles is described in LiF and MgO single crystals. The principal effect of the second phase particles is to change the cleavage step density. The apparent fracture surface energy, gamma sub i, of MgO is increased by one hundred per cent by the presence of cube shaped 10 micrometers on a side and spaced at 50 micrometers. The measured increase in gamma sub i is consistent with the increased work done in forming cleavage steps by shearing at a stress equal to the theoretical shear strength. (Author)

AD-A012 187/1GA PC$3.25/MF$2.25
Colorado Univ Boulder Dept of Mechanical Engineering
Solution Strengthening of MgO Crystals,
C. Norman Ahlquist. 11 Jul 74, 5p AFOSR-TR-75-0901
Grant AF-AFOSR-2603-74
Availability: Pub. in Jnl. of Applied Physics, v46 n1 p14-17 Jan 75.

Descriptors: *Magnesium oxides, *Single crystals, *Doping, *Transition metals, *Strength(General), Aluminum, Chromium, Iron, Solid solutions, Reprints.

The solution strengthening of MgO by dissolved transition metal cations is examined. Trivalent cations, Al(3+), Cr(3+), and Fe(3+) harden MgO equally, while divalent cations Fe(2+) and Ni(2+) have little effect upon yield strength. The strengthening is inconsistent with the elastic theory of Fleischer for pinning of dislocations at tetragonal defects. The solution hardening by Al(3+), Cr(3+), and Fe(3+) is quantitatively explained by a recent theory by Gilman. Strengthening in this theory results from the change in electrostatic energy that occurs when a trivalent ion-pair-cation-vacancy complex is sheared by a dislocation passing through the complex. (Author)

AD-A012 188/9GA PC$3.25/MF$2.25
Colorado Univ Boulder Dept of Mechanical Engineering
The Influence of Yield Strength on Fracture of Semi-Brittle Ceramic Crystals,
C. Norman Ahlquist. 5 Oct 73, 7p AFOSR-TR-75-0900
Grant AF-AFOSR-2603-74
Abstract in French and German.
Availability: Pub. in ACTA Metallurgica, v22 p1133-1137 Sep 74.

Descriptors: *Brittleness, *Yield strength, *Single crystals, *Ceramic materials, *Fracture(Mechanics), Alkali metal compounds, Halides, Magnesium oxides, Reprints.

Cleavage crack extension has been studied in alkali halide and MgO single crystals. The apparent surface energy for fracture reinitiation, gamma sub i, increases with increasing yield strength, Tau sub 0, as a result of a decrease in the extent of plastic flow preceding fracture reinitiation. (Author)

AD-A012 323/2GA PC$3.25/MF$2.25
Carnegie-Mellon Univ Pittsburgh Pa Metal Physics Lab
A Microstructural Study of Massive Transformations in the Fe-Ni System,
T. B. Massalski, J. H. Perepezko, and J. Jaklovsky. 19 Jul 74, 8p ARO-8253.19-MC
Grant DAHC04-74-G-0080
Availability: Pub. in Materials Science and Engineering, 18 p193-198 1975.

Descriptors: *Crystal lattices, Microstructure, Phase transformations, Iron alloys, Nickel alloys, High temperature, Reprints.
Identifiers: Body centered cubic lattices, Face centered cubic lattices.

The formation of the b.c.c. alpha phase from the f.c.c. gamma phase by the process of a massive tranformation has been studied in the Fe-Ni system over a range of composition and colling rates.

N75-23751/1GA PC$6.25/MF$2.25
Technische Universitaet, Munich (West Germany).
Research on the Influence of Dislocations on the Diffraction of X Rays and gamma Rays on Copper Single Crystals Untersuchung des Einflusses von Versetzungen Auf die Beugung von Rontgen- und Gammastrahlen an Kupfereinkristallen.
Ph.D. Thesis.
A. Freund. 1974, 170p
Language in German.

Descriptors: *Crystal dislocations, *Single crystals, *Wave diffraction, Copper, Crystal lattices, Gamma rays, Mosaics, X ray diffraction.

For abstract, see STAR 1315

20C. Electricity and Magnetism

AD-A011 736/6GA PC$3.25/MF$2.25
Cornell Univ Ithaca N Y Baker Lab
Low Temperature Magnetic Susceptibility of Uranium and Rare Earth Tungsten Oxide Bronzes,
Jack F. Thomas, and M. J. Sienko. 28 Jun 74, 6p AFOSR-TR-75-0864
Grant AF-AFOSR-2583-74
Availability: Pub. in Jnl. of Chemical Physics, v61 n10 p3920-3924, 15 Nov 74.

Descriptors: *Uranium, *Bronze, *Rare earth compounds, *Tungsten compounds, *Oxides, Magnetic properties, Low temperature, Thorium, Reprints.
Identifiers: *Magnetic susceptibility.

Magnetic susceptibilities of uranium tungsten bronzes and their thorium-diluted counterparts, have been measured by the Faraday method over the range 1.6-300 K. The sharp, dilution-independent antiferromagnetic behavior previously reported was not confirmed. Weiss constants observed showed a weak decline with dilution. Susceptibilities of light rare earth bronzes (REPr, Nd) deviated at low temperatures from Curie-Weiss behavior, probably because of changes in population of intra-atomic levels. For the heavy rare earth bronzes (RE = Gd, Tb, Dy, Ho, Er), very small Weiss constants were observed. Near independence of the Weiss constants of conduction electron density and rare earth magnetic content suggests that the apparent Curie-Weiss behavior is mainly a manifestation of crystal field interactions, not an indication of magnetic exchange effects. (Author)

AD-A011 790/3GA PC$3.25/MF$2.25
Delaware Univ Newark Dept of Mathematics
Diffraction by a Black Screen,
John S. Asvestas. 5 Sep 74, 5p AFOSR-TR-75-0887
Grant AF-AFOSR-2634-74
Availability: Pub. in Jnl. of the Optical Society of America, v65 n2 p155-158 Feb 75.

Descriptors: *Electromagnetic radiation, *Diffraction, Partial differential equations, Maxwells equations, Electromagnetic wave filters, Reprints.
Identifiers: Kottler's solution.

The problem of diffraction of electromagnetic waves by a black screen, as defined by Kottler, is reconsidered. The solution proposed by Kottler does not satisfy one of the conditions of the problem, hence it is incorrect. (Author)

AD-A011 904/0GA PC$3.25/MF$2.25
California Univ San Diego La Jolla Dept of Physics
Magnetic Properties of ZrZn2 Under Pressure,
J. G. Huber, M. B. Maple, D. Wohlleben, and G. S. Knapp. 10 Sep 74, 7p AFOSR-TR-75-0884
Grant AF-AFOSR-2073-71
Availability: Pub. in Solid State Communications, v16 p211-216 1975.

Descriptors: *Zirconium alloys, *Zinc alloys, *Magnetic properties, High pressure, Magnetic fields, Magnetization, Reprints.
Identifiers: Stoner-Wohlfarth theory.

The high field magnetization of a sample of ZrZn1.9 was measured at pressures up to 20 kbar. Between 0 and 14kbar the Curie temperature TO drops linearly from 27.6 to 9.1 degree K; it then curves downward and crosses to To = 0 axis at critical pressure pc of 18 kbar. The spontaneous zero temperature magnetization Mo scales with To. In the ferromagnetic region M(H,T) is at all pressures consistent with the Stoner-Wohlfarth theory. This theory, however, does not explain the initial linear dependence of To on p. The paramagnetic Curie-Weiss constant is nearly the same above and below pc. (Author)

AD-A011 965/1GA PC$3.25/MF$2.25
School of Aerospace Medicine Brooks AFB Tex
Measurements of Power Absorption by Human Phantoms Immersed in Radiofrequency Fields,
Stewart J. Allen. 1974, 8p Rept no. SAM-TR-74-232
Presented at Conference on Biological Effects on Non-Ionizing Radiation.
Availability: Pub. in Annals of the New York Academy of Sciences, v247 p494-498, 28 Feb 75.

Descriptors: *Simulators, *Dosimetry, *Body fluids, *Radiation absorption, Human body, Biological systems, Coupling(Interaction), Radiofrequency power, High frequency, Power levels, Analogs, Reprints.
Identifiers: Nonionizing radiation, Human phantoms.

The objective of this research is to determine the frequency dependence of power absorption in the HF band. A 90-kg Ringer's solution phantom was exposed to RF fields from 10-30 MHz in a TEM mode exposure device. A differential power meter was used to measure input, reflected, and output power. Phantom absorbed power was calculated from these data and compared with theoretical calculations utilizing the Mie solution for a prolate spheroid of the same approximate dimensions. Excellent agreement was found in comparing the empirical and theoretical results. The need for frequency corrections to present safety standards for the HF band and lower frequencies is indicated. (Author)

AD-A011 979/2GA PC$3.25/MF$2.25
Duke Univ Durham N C Dept of Physics
The Temperature Dependence of the g-Shifts of Conduction Electrons in Pure and Impure Alkali Metals,
Juh-Tzeng Lue. 11 Sep 74, 22p ARO-9491.13-P
Grant DA-ARO-D-31-124-72-G96
Summary in Italian and Russian.
Availability: Pub. in Il Nuovo Cimento, v26B n1 p243-262, 11 Mar 75.

Descriptors: *Alkali metals, *Electrons, *Electrical conductivity, Fermi surfaces, Wave functions, Lithium, Temperature, Reprints.

The g-shifts of conduction electrons in pure and impure alkali metals have been calculated by taking the average over the Fermi surface along the (100), (110) and (111) directions. The conduction-electron wave functions are approximated by taking orthogonalized plane waves orthogonal to the core states and are the irreducible representations in the double group. The calculated g-shift for Li is -6 x 10 to the -5th power which is in satisfactory agreement with the experimental result -6.1 + or - 0.2 x 10 to the -5th power. The temperature dependence of the g-shift is obtained when the integration over the K-vector involves the Fermi-Dirac distribution. The g value for Li shifts only about 0.3% from a temperature of 4 to 500 K. The wave functions for the impure alkali metals are obtained by Bardeen expansion to second order around the center of the Brillouin zone. (Author)

COM-75-50355/7GA Not available NTIS
National Bureau of Standards, Washington, D.C.
Low Temperature Thermal Conductivity Measurements on Longitudinal and Transverse Sections of a Superconducting Coil.
Final summary rept. Dec 73-Jun 74,
J. G. Hust. Jan 75, 4p
Sponsored in part by Naval Ship Research and Development Center, Annapolis, Md.
Pub. in Cryogenics, v15 n1 p8-11 Jan 75.

Descriptors: *Superconducting magnets, Magnet coils, Cryogenics, Thermal conductivity.
Identifiers: Reprints.

Thermal conductivity measurements have been performed on longitudinal and transverse sections of a superconducting coil at 5, 79, 196 and 276K. The composite coil sections are composed of copper-stabilized niobium-titanium wire embedded in epoxy. Tabular and graphical data are presented. These data are compared to values calculated on the basis of the components of the coil sections. Reasonably good agreement is obtained.

N75-24502/7GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Magnetic Torque on a Rotating Superconducting Sphere.
L. B. Holdeman. May 75, 52p NASA-TR-R-443, M138

Descriptors: *Diamagnetism, *Rotating spheres, *Superconductivity, Electrodynamics, Gyroscopes, Macroscopic equations, Magnetic fields, Torque.

For abstract, see STAR 1315

20D. Fluid Mechanics

AD-A011 741/6GA PC$3.25/MF$2.25
California Inst of Tech Pasadena
A Theoretical Mechanism of Spirochete Locomotion,
A. T. Chwang, H. Winet, and Th. Y. Wu. 22 May 73, 10p Rept no. E-97A-34
Contract N00014-67-A-0094-0012, Grant NSF-GK-31161X
Availability: Pub. in Jnl. of Mechanochemical Cell Motility, v3 p69-76 1974.

Descriptors: *Fluid mechanics, *Microorganisms, Locomotion, Self propelled, Momentum, Hydrodynamics, Wave propagation, Helixes, Velocity, Physiology, Reprints.
Identifiers: Spirochete locomotion, Resistive theory.

This paper attempts to establish a theoretical mechanism of spirochetal locomotion based on the hypothesis that a self spin of the spirochete about its longitudinal body axis is possible so that the angular momentum as well as the linear momentum can remain balanced. By adopting the 'resistive theory' of Gray and Hancock, the hydrodynamic calculation yields the propulsion velocity and the self spin frequency as functions of the helical wave parameters and the viscosity of the aqueous environment. The theoretical prediction of the propulsion velocity is in agreement with the theory of Holwill and Burge, but is at variance with Wang and Jahn's condition of no apparent 'wave slippage.' (Author)

AD-A011 742/4GA PC$3.75/MF$2.25
California Inst of Tech Pasadena Div of Engineering and Applied Science
Hydromechanics of Low-Reynolds-Number Flow. Part 2. Singularity Method for Stokes Flows,
Allen T. Chwang, and Th. Yao-Tsu Wu. 18 Mar 74, 29p Rept no. E-97A-35
Contract N00014-67-A-0094-0012, Grant NSF-GK-31161X
See also Part 1, AD-783 125.
Availability: Pub. in Jnl. of Fluid Mechanics, v67 pt4 p787-815 1975.

Descriptors: *Fluid mechanics, *Viscous flow, Geometric forms, Asymmetric bodies, Reynolds number, Mathematical models, Cylindrical bodies, Spheres, Cartesian coordinates, Incompressible flow, Pressure, Viscosity, Force(Mechanics), Reprints.
Identifiers: Hydromechanics, Stokes equation, Exact solutions, Singularity method, Dirac delta function.

AD-A011 743/2GA PC$3.75/MF$2.25
California Inst of Tech Pasadena Div of Engineering and Applied Science
An Oscillating-Boundary-Layer Theory for Ciliary Propulsion,
C. Brennen. 2 Nov 73, 27p Rept no. E-97A-36
Contract N00014-67-A-0094-0012, Grant NSF-GK-31161X
Availability: Pub. in Jnl. of Fluid Mechanics, v65 pt4 p799-824 1974.

Descriptors: *Viscous flow, *Fluid mechanics, *Microorganisms, *Turbulent boundary layer, Locomotion, Ciliata, Motion, Harmonics, Surfaces, Interactions, Thrust, Self propelled, Mathematical models, Reynolds number, Equations of motion, Reprints.
Identifiers: *Ciliated microorganisms, *Ciliary propulsion, *Self propelled bodies, Harmonic motion, Stokes law.

This paper analyses the locomotion of a finite body propelling itself through a viscous fluid by means of travelling harmonic motions of its surface. The present paper employs the envelope model of fluid/cilia interaction to construct equations of motion for the oscillating boundary layer. The final solution for the propulsive velocity is obtained by application of the condition of zero total force on the self-propelling body; alternatively, if the organism is held at rest the thrust it generates can be computed. The results are compared with the relatively sparse observations for a number of micro-organisms. (Author)

AD-A011 750/7GA PC$3.25/MF$2.25
Naval Postgraduate School Monterey Calif
Analysis of Curved Target-Type Thrust Reversers,
Turgut Sarpkaya, and Gerardo Hiriart. 7 Jun 74, 9p
Availability: Pub. in AIAA Jnl., v13 n2 p185-192 Feb 75.

Descriptors: *Thrust reversal, *Jets, *Curves(Geometry), *Deflectors, Two dimensional, Axisymmetric, Deflection, Mathematical models, Coanda effect, Reprints.

The reverse-thrust performance of two-dimensional and axisymmetric curved deflectors, symmetrically situated with respect to the impinging jet, is analyzed through the use of Levi-Civita's method, Belotserkovsky's integral method, and the finite element method. The predicted results are shown to be in reasonable agreement with the available experimental data. The real-fluid effects such as Coanda effect, entrainment, and the pressure ratio are discussed in the light of the present inviscid flow analyses. (Author)

AD-A011 767/1GA Not available NTIS
Colorado Univ Boulder
Proceedings of the Fourth International Conference on Numerical Methods in Fluid Dynamics, Held at University of Colorado on June 24-28, 1974.
1974, 468p Rept no. ISBN-0-387-07139-3
Availability: Available as Lecture Notes in Physics 35, pub. by Springer-Verlag, New York, $16.00, ISBN-0-387-07139-3.

Descriptors: *Fluid dynamics, *Meetings, *Numerical methods and procedures, Fluid mechanics, Problem solving, Boundary layer flow, Mathematical models, Algorithms, Airfoils, Matrices(Mathematics), Equations of motion, Shock waves, Turbulent flow, Nonuniform flow, Simulation, Jet flow, Hypersonic characteristics, Bubbles, Secondary flow, Viscous flow, Model tests, Geometric forms, Angle of attack, Supersonic characteristics, Plasmas(Physics), Vortices, Pulses, Transonic characteristics, Navier Stokes equations, Magnetohydrodynamics, Hydrodynamics, Atmospheric motion.
Identifiers: Unsteady flow.

The lecture presentations in a 1974 international meeting on mathematical methods in fluid flow are reported. Some of the topics involved are turbulent boundary layers, shock waves; supersonic, transonic, and hypersonic flow; plasmas, jets, simulation; conical, flat plate, cylindrical, and blunt bodies; equations of motion, atmospheric studies, time-dependent, reverse, and viscous flow; and mathematical models. Gas dynamics and hydrodynamics data are given.

AD-A011 770/5GA PC$3.75/MF$2.25
Oceanics Inc Plainview N Y
An Integral Approach to Lifting Wing Theory at Mach One.
Final rept.,
Theodore R. Goodman. Jun 75, 43p Rept no. 75-116 AFOSR-TR-75-0822
Contract F44620-72-C-0079

Descriptors: *Transonic airfoils, *Lifting surfaces, Theory, Pressure distribution, Wings, Problem solving, Aspect ratio, Rectangular bodies, Lifting bodies, Transients, Angle of attack.

An approach to lifting wing theory at Mach one is presented that utilizes an integral method similar to the Karman-Pohlusen method in boundary layer theory. As in any integral method the results obtained are approximate in nature. Nonetheless, comparison with experimental data shows good agreement in cases for which experimental data are available. The method can easily be used to determine the lift on wings of finite aspect ratio and also to solve transient lifting problems. The method is demonstrated by solving for the pressure distribution on a lifting airfoil of arbitrary symmetric cross-section, the lift on a wing of rectangular platform, and the transient lift on an airfoil due to a sudden change in angle of attack.

AD-A011 829/9GA PC$3.75/MF$2.25
Johns Hopkins Univ Silver Spring Md Applied Physics Lab
Steady and Unsteady Flow in Straight Rectangular Ducts.
Technical memo.,
V. O'Brien. Apr 75, 37p Rept no. APL-JHU-TG-1276
Contract N00017-72-C-4401

Descriptors: *Ducts, *Fluid flow, Incompressible flow, Rectangular bodies, Aspect ratio, Laminar flow.
Identifiers: *Oscillatory flow.

A new solution for steady parallel flow in a rectangular duct is given that is valid for any aspect ratio a/b (where a and b are orthogonal half-widths of the duct), in contrast to older formulas that are restricted to certain ranges of a/b. New solutions for oscillatory flow in rectangular ducts are also given that replace a set of invalid published solutions. They provide calibration constants for relating local and average values of the unsteady velocity flow measurements in any rectangular channel.

AD-A011 983/4GA PC$3.75/MF$2.25
Ohio State Univ Columbus Aeronautical and Astronautical Research Lab
High Reynolds Number Transonic Testing.
Final rept. 30 Jun 71-30 Jun 74,
John D. Lee. May 75, 43p ARL-75-0112
Contract F33615-71-C-1911

Descriptors: *Transonic characteristics, *Wind tunnel tests, Feasibility studies, Model tests, Airfoils, Wind tunnel models, Interactions, Two dimensional flow, Simulation, Shock waves, Flow separation, Boundary layer flow, Reynolds number, Supercritical flow.
Identifiers: High Reynolds number tunnels.

An experimental program was conducted to investigate the feasibility of using a pressurized blowdown wind tunnel to simulate transonic flows at flight Reynolds numbers. A 4 inch by 10 inch channel proved to be capable of supplying essentially two-dimensional flows over airfoil models; flow departure from the two-dimensional approximation occurred when shock waves terminating local flows of Mach number greater than about 1.5 caused separation of the sidewall boundary layers. Simulation of the interaction between the terminal shock wave and the model boundary layer appeared to be adequate. Comparisons with data from a larger wind tunnel indicated little or no interference in the subcritical flow range but a large and unpredictable induced attack angle.

AD-A012 004/8GA PC$3.75/MF$2.25
Virginia Polytechnic Inst and State Univ Blacksburg Dept of Engineering Science and Mechanics
Compressible Boundary Layers over Wavy Walls,
Spyridon G. Lekoudis, Ali H. Nayfeh, and William S. Saric. May 75, 39p Rept no. VPI-E-75-9
Contract N00014-72-A-0136-002

Descriptors: *Viscous flow, *Compressible flow, *Turbulent boundary layer, Walls, Disturbances, Equations of motion, Numerical methods and procedures, Linear systems, Boundary layer flow.
Identifiers: Wavy walls.

An analysis is presented of compressible viscous flows past wavy walls, without restricting the mean flow to be linear in the disturbance layer. Linearization of the compressible disturbance equations results in a system of six first-order differential equations for the perturbation quantities. The method of orthonormalization is used to control the error growth in the numerical solution of these equations. The present results agree more closely with experimental data than the results obtained by using Lighthill's theory, which restricts the mean flow to be linear in the disturbance layer.

AD-A012 025/3GA PC$3.25/MF$2.25
Aeronautical Research Inst of Sweden Stockholm Aerodynamics Dept
Transonic Flow at a Slotted Test Section Wall.
Interim scientific rept. no. 4, 1 Mar 74-28 Feb 75,
Sune B. Berndt, and Hans Sorensen. Apr 75, 13p AFOSR-TR-75-0851
Grant AF-AFOSR-2184-72
See also AD-784 934.

Descriptors: *Transonic characteristics, *Wind tunnels, *Walls, *Air flow, Slots, Flow fields, Mathematical models, Boundary layer flow, Interference, Interactions, Pressure, Flow visualization, Probes, Wings, Model tests, Secondary flow, Jet flow, Sweden.
Identifiers: Wall interference, Slot flow, Slotted walls.

A continuing investigation of transonic flow is in the reporting stage, with detailed scientific reports to be submitted in the near future. The present report has the character of a brief summary. The reports to appear are concerned with : (1) A simple model for slot-flow boundary-layer interaction, (2) theoretical analysis of the flow through a slotted wall, (3) measurements of slot flow, and (4) numerical computation of axi-symmetric transonic flow in a slotted test section.

AD-A012 071/7GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Cambridge Aerophysics Lab
The Measurement of Aerodynamic Forces on a Short Body at High Angles of Attack with the Magnetic Balance System.
Final rept. 13 Mar-31 Dec 74,
R. L. Bisplinghoff, J. B. Coffin, E. E. Covert, D. M. Finn, and C. W. Haldeman. Dec 74, 66p Rept no. TR-190 PA-TR-4806
Contract DAAA21-74-C-0304

Descriptors: *Aerodynamic characteristics, *Blunt bodies, *Wind tunnel tests, *Magnetic devices, Balances, Lift, Aerodynamic drag, Pitch(Motion), Coefficients, Curved profiles, Angle of attack, Modification, Test facilities, Power supplies, Subsonic characteristics.
Identifiers: Magnetic suspension.

Aerodynamic lift coefficient, drag coefficient and pitching moment coefficient are reported for a short finned body at angles of attack from -20 to +20 degrees as measured with the magnetic balance system at M=.18 and .37, Re=100 000 and 200 000. Also reported are modifications made to the magnetic balance system in order to extend the angle of attack range. A new controllable D.C. power supply was constructed using 300 ampere, 30 volt D.C. aircraft generators. The steady state and transient response characteristics of this power supply are reported.

AD-A012 205/1GA PC$5.25/MF$2.25
Ballistic Research Labs Aberdeen Proving Ground Md
An Integral Analysis of Boundary Layers on Moving Walls.
Final rept.,
Kevin S. Fansler, and James E. Danberg. Jun 75, 118p Rept no. BRL-1792

Descriptors: *Boundary layer flow, *Integral equations, *Numerical integration, Two dimensional flow, Incompressible flow, Laminar boundary layer, Shock waves, Tables(Data).
Identifiers: Boundary layer separation, Similarity theory.

An integral method for calculating the non-similar steady two-dimensional boundary-layer development on both upstream and downstream moving walls has been developed. Separation from moving walls is briefly reviewed and a separation criterion for the technique is developed that conforms with some accepted ideas on boundary-layer separation. The integral-momentum and integral-energy boundary-layer equations have been integrated simultaneously by using the shape factor relationships derived from moving-wall similarity solutions. The results are found to compare favorably with an exact solution and an approximate solution. The stability of the boundary-layer development calculations is also examined.

AD-A012 271/3GA PC$3.25/MF$2.25
Naval Ship Research and Development Center Bethesda Md
A Modified Law of the Wake for Turbulent Shear Flows,
Paul S. Granville. May 75, 18p Rept no. NSRDC-4639

Descriptors: *Wake, *Shear properties, *Turbulent flow, Turbulent boundary layer, Velocity, Mathematical models, Polynomials, Walls.
Identifiers: Shear flow, Velocity profiles, Similarity theory.

The analytical description of similarity-law velocity profiles for turbulent shear flow has been improved by a proposed polynomial which modifies the Coles law of the wake to satisfy the outer slope condition.

AD-A012 278/8GA PC$7.50/MF$2.25
Missouri Univ Rolla Rock Mechanics and Explosives Research Center
The Structure of High Speed Fluid Jets and Their Use in Cutting Various Soil and Material Types.
Final rept.,
D. A. Summers, and J. L. Zakin. 30 Apr 75, 233p
Contract DAAK02-74-C-0006

Descriptors: *Soils, *Cutting fluids, *Jets, Fluid flow, Pressure, Wood, Plexiglas, Additives, Soil mechanics, Drag reduction.
Identifiers: *Drag reducing fluids, Polyoxyethylene, Polyacrylamides.

This report describes an investigation into the effect of fluid additives upon the structure of high speed water jets, and the resulting change in the cutting ability of the jets when such additives are used. A literature review indicates that the effects of change in jet viscosity and surface tension upon jet structure are reduced with increase in jet velocity, and that while increasing jet viscosity improves jet cohesion, it reduces jet cutting ability. For this reason the study was directed towards the effect of viscoelastic additives, polymerized ethylene oxide and polyacrylamides, the results from which were compared with results from nonionic soaps and guar gum. The viscoelastic additives were found to give improved jet cohesion.

AD-A012 293/7GA PC$4.75/MF$2.25
Boston Univ Mass Engineering Labs
Numerical Solution of the Flow Field about Two-Dimensional Shaved Circular Cylinders in Supersonic Flow.
Scientific interim rept.,
Jeng S. Huang. Dec 74, 81p Rept no. Scientific-3 AFCRL-TR-74-0418
Contract F19628-71-C-0209

Descriptors: *Supersonic flow, *Flow fields, Integral equations, Method of characteristics, Equations of motion, Shock waves, Subsonic flow, Partial differential equations, Numerical integration.

A theoretical investigation of the flow of a perfect gas over two-dimensional shaved circular cylinders has been conducted at supersonic Mach numbers for the purpose of obtaining shock wave shapes. An integral relation method is used for the numerical solution of the flow in the subsonic-transonic region. For the supersonic region, the method of characteristics is used to obtain a numerical solution. The computer programs of both methods are developed for calculating the properties of the flow field. The starting values for the characteristic method are obtained from the integral relation method. Numerical solutions have been obtained for a perfect gas in thermodynamic equilibrium with ratio of specific heat, gamma = 1.4 over a Mach number range from 2 to 10. Results for the shock wave shape and stand-off distance are presented for all numerical solutions and comparison is made with experimental results. Results for the simple circular cylinder are also shown, and compared with the results obtained by other authors.

AD-A012 337/2GA PC$4.75/MF$2.25
Naval Ship Research and Development Center Bethesda Md Ship Performance Dept
Effect of Speed on the Wake in Way of the Propeller Plane for the DD 963 Class Destroyer Represented by Model 5265-1B.
Final rept.,
William G. Day, Jr.. Jul 75, 87p Rept no. SPD-311-37

Descriptors: *Wake, *Destroyers, Ship models, Propeller blades, Propellers(Marine), Propeller struts, Ship hulls, Model basins, Velocity, Water flow, Pitot tubes, Hydrodynamics, Harmonic analysis.
Identifiers: *DD 963 class vessels.

Three wake survey experiments were conducted on Model 5265-1B representing the DD 963 Class Destroyer to determine the effect of speed. Longitudinal, tangential and radial velocity components for experiments at speeds corresponding to 20 knots, 28 knots and maximum speed are presented. Comparison is made with previous wake surveys demonstrating the repeatability of these experiments. A Harmonic Analyses of the circumferential distribution of the velocity component ratios were performed and are reported herein. (Author)

AD-A012 354/7GA PC$3.75/MF$2.25
Grumman Aerospace Corp Bethpage N Y
Analysis of the Interaction of a Weak Normal Shock Wave with a Turbulent Boundary Layer,
R. E. Melnik, and B. Grossman. Jun 74, 34p
Contracts N00017-71-C-0336, NAS1-12426
Presented at AIAA Fluid and Plasma Dynamics Conference (7th), Palo Alto, Calif., 17-19 Jun 74, Rept. no. 74-598.

Descriptors: *Turbulent boundary layer, *Shock waves, *Fluid dynamics, Interactions, Mathematical models, Asymptotic series, Reynolds number, Layers, Inviscid flow, Rotation, Shear properties, Blending, Pressure distribution, Numerical methods and procedures, Equations of motion, Skin friction.
Identifiers: Shock wave interactions.

The method of matched asymptotic expansions is used to analyze the interaction of a normal shock wave with an unseparated turbulent boundary layer on a flat surface at transonic speeds. The theory leads to a three-layer description of the interaction in the double limit of Reynolds number approaching infinity and Mach number approaching unity. The interaction involves an outer, inviscid rotational layer, a constant shear-stress wall layer, and a blending region between them.

AD-A012 370/3GA PC$3.25/MF$2.25
Naval Academy Annapolis Md Div of Engineering and Weapons
The Effect of Resistors and Partial Enclosures on the Attachment Characteristics of a Coanda Surface.
Final technical rept.,
Vincent J. Lopardo. 1 May 75, 19p Rept no. EW-5-75

Descriptors: *Fluid dynamics, *Coanda effect, *Jet flow, Jet plane noise, Gas turbines, Turbojet engines, Noise reduction, Surface properties, Test methods, Captive tests, Feasibility studies, Model tests, Suppressors, Naval aircraft.
Identifiers: Ground runup testing, Coanda surfaces.

This paper reports on the results of an experimental program which investigated the effects of various parameters on the attachment characteristics of flow over a Coanda surface. The parameters studied were (a) resistance elements at the exhaust region normal to the surface, (b) normal knife edge extension into the jet flow at the entrance of the Coanda surface, and (c) combination effect of a backwall and resistance element. The results are presented in the form of graphs, which can be interpreted to give the relative reductions in attachment.

AD-A012 383/6GA PC$5.75/MF$2.25
National Aviation Facilities Experimental Center Atlantic City N J
Investigation of the Vortex Wake Characteristics of Jet Transports During Climbout and Turning Flight.
Final rept. Oct-Nov 73,
Leo J. Garodz, and Nelson J. Miller. May 75, 132p Rept no. FAA-NA-74-30 FAA-AEQ-75-1

Descriptors: *Jet transport planes, *Wake, *Climbing, *Turning flight, Vortices, Noise reduction, Hazards, Surveys, Aviation safety, Airports, Flight testing, Vortex generators, Trailing edge.
Identifiers: *Trailing vortices, *Propeller aircraft, DOT/5A.

The characteristics of the trailing vortices of several large propeller and jet transport aircraft are reported. An investigation centered around jet transport vortex persistence and movement during noise abatement-type departure operations at the Los Angeles International Airport and how approaching aircraft could avoid these vortices, although, it is concluded that the results and conclusions would be applicable to similar operations at other airports. The study is primarily based upon full-scale flight tests of vortex characteristics and their effect on encountering aircraft, conducted by NAFEC, NASA, Boeing, and the Royal Aircraft Establishment (RAE).

AD-A012 399/2GA PC$5.75/MF$2.25
Massachusetts Inst of Tech Cambridge Fluid Dynamics Research Lab
On the Development of a Unified Theory for Vortex Flow Phenomena for Aeronautical Applications.
Technical rept. 1 Nov 73-31 Oct 74,
Thomas K. Matoi. 14 Apr 75, 145p
Contract N00014-67-A-0204-0085

Descriptors: *Fluid dynamics, *Vortices, *Lifting surfaces, Wings, Aspect ratio, Interactions, Slender bodies, Vortex shedding, Mathematical models, Sheets, Theory.
Identifiers: Vortex flow.

The low-speed performance of a high span loading aircraft depends critically on the structure and stability of the vortex flow field created by the wing. Conventional formulation of lifting surface theory is not adequate to handle the low-aspect-ratio wing problem since the leading edge vortices add several complications. Specifically, the nonplanar nature of the vortex sheet may have to be considered explicitly, the leading-edge loading is altered, and vortex breakdown is a rotational phenomenon. Due to those additional difficulties, a study was made of the state of the art in vortex-wing interactions.

N75-23470/8GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Effects of Geometric Variables on the Performance of a Probe for Direct Measurement of Free-Steam Stagnation Pressure in Supersonic Flow.
L. M. Couch. May 75, 70p NASA-TN-D-7887, L-9757

Descriptors: *Free flow, *Stagnation pressure, *Supersonic flow, *Variable geometry structures, Isentropic processes, Mach number, Pitot tubes, Pressure recovery, Pressure sensors.

For abstract, see STAR 1315

N75-23478/1GA PC$3.75/MF$2.25
Boston Univ., Mass. Dept. of Aerospace Engineering.
Subsonic and Supersonic Indicial Aerodynamics and Aerodynamic Transfer Function for Complex Configurations.
L. Morino. Sep 74, 33p NASA-CR-142818, TN-74-01
Contract NGR-22-004-030

Descriptors: *Aerodynamic configurations, *Finite element method, *Subsonic speed, *Supersonics, Aircraft configurations, Integral calculus, Laplace equation.

For abstract, see STAR 1315

N75-23516/8GA PC$5.75/MF$2.25
Max-Planck-Institut fuer Stroemungsforschung, Goettingen (West Germany).
Unsteady Behavior of Transonic Flows.
G. E. A. Meier. 1974, 138p MPIS-MITT-59
In German; English Summary.

Descriptors: *Curvature, *Oscillating flow, *Shock wave interaction, *Transonic flow, Nozzle flow, Transonic wind tunnels, Wing profiles.

For abstract, see STAR 1315

N75-23571/3GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
A Study of Reacting Free and Ducted Hydrogen/Air Jets.
H. L. Beach, Jr.. May 75, 46p NASA-TM-X-72678

Descriptors: *Air jets, *Ducted flow, *Free flow, *Hydrogen, Dynamic models, Eddy viscosity, Flow distribution, High temperature gases, Hypersonic flow, Reaction kinetics, Turbulent mixing.

For abstract, see STAR 1315

N75-23572/1GA PC$4.25/MF$2.25
Aerojet Liquid Rocket Co., Sacramento, Calif.
Multiple Jet Study Data Correlations.
Final Report.
R. E. Walker, and R. G. Eberhardt. Apr 75, 74p NASA-CR-134795
Contract NAS3-18026

Descriptors: *Air jets, *Data correlation, *Jet mixing flow, Combustion chambers, Exponential functions, Flow velocity, Gas streams, Gas turbines, Subsonic flow.

For abstract, see STAR 1315

N75-23883/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Critical Flow and Pressure Ratio Data for LOX Flowing Through Nozzles.
R. C. Hendricks, R. J. Simoneau, and R. F. Barrows. 1975, 12p NASA-TM-X-71725, E-8347
Conf-Presented at the 14TH Intern. Congr. Of the Intern. Inst. Of Refrig., Moscow, 20-30 Sep. 1975.

Descriptors: *Critical flow, *Liquid oxygen, *Nozzle flow, Critical velocity, Flow geometry, Flowmeters, Inlet flow, Isotherms, Pressure gradients, Stagnation flow.

For abstract, see STAR 1315

N75-23886/5GA PC$5.25/MF$2.25
Boston Univ., Mass. Dept. of Aerospace Engineering.
Steady Incompressible Potential Flow around Lifting Bodies Immersed in a Fluid.
M.S. Thesis.
E. A. Chiuchiolo. 1974, 123p NASA-CR-142817
Contract NGR-22-004-030

Descriptors: *Incompressible flow, *Lifting bodies, *Potential flow, *Steady flow, Computer techniques, Digital computers, Numerical analysis, Pressure distribution, Run time (Computers).

For abstract, see STAR 1315

N75-23887/3GA PC$5.25/MF$2.25
Boston Univ., Mass. Dept. of Aerospace Engineering.
A Finite Element Formulation for Supersonic Flows around Complex Configurations.
L. Morino. Dec 74, 116p NASA-CR-142819, TR-74-01
Contract NGR-22-004-030

Descriptors: *Aerodynamic configurations, *Finite element method, *Supersonic flow, Cartesian coordinates, Integral equations, Linear equations, Numerical integration, Perturbation theory.

For abstract, see STAR 1315

N75-23888/1GA PC$6.25/MF$2.25
Martin Marietta Corp., Denver, Colo.
Analysis of Skylab Fluid Mechanics Science Demonstrations.
Final Technical Report, Sep. 1974 - May 1975.
J. R. Tegart, and J. R. Butz. May 75, 159p NASA-CR-120765, MCR-75-151-1
Contract NAS8-33109

Descriptors: *Fluid mechanics, *Skylab program, Coalescing, Containerless melts, Data correlation, Data reduction, Oscillating flow, Reduced gravity.

For abstract, see STAR 1315

N75-23890/7GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Application of Local Linearization and the Transonic Equivalence Rule to the Flow About Slender Analytic Bodies at Mach Numbers Near 1.0.
R. W. Tyson, and R. J. Muraca. 30 Jan 75, 52p NASA-TM-X-72654

Descriptors: *Axisymmetric flow, *Bodies of revolution, *Mach number, *Transonic flow, Aerodynamic loads, Angle of attack, Force distribution, Linearization, Pressure distribution.

For abstract, see STAR 1315

N75-24431/9GA PC$3.75/MF$2.25
Technische Hogeschool, Delft (Netherlands). Lab. for Aero- and Hydrodynamics.
Electromagnetic Fields Generated by Turbulent Air Flow and Shock Waves.
J. Clark. Jan 75, 34p WTHD-68

Descriptors: *Air flow, *Electromagnetic fields, *Turbulent flow, Aerodynamics, Hot-wire anemometers, Polarization (Charge separation).

For abstract, see STAR 1315

PB-242 627/8GA PC$5.75/MF$2.25
Council for Scientific and Industrial Research, Pretoria (South Africa). Chemical Engineering Research Group.

Effect of Packing Geometry on Transport Phenomena in Packed Beds of Spheres,
R. E. Hicks. Sep 74, 139p CSIR-CENG-051, ISBN-0-798800628-1

Descriptors: *Beds(Process engineering), *Packing materials, Mass transfer, Pressure drag, Drag, Spheres, Geometry, South Africa.

On the premise that proper selection of packing geometry can result in reduced running costs in packed beds of spheres, mass transfer rates, shear drag and pressure drag are determined in four regular packings in the flow range 200<Re<3 000. Three of the packings had identical mean voidage but differed in either orientation or structure. It was established that the fourfold differences in pressure drag found in packings of identical mean voidage is a consequence of differences in the distribution of local voidages through these packings. Surface averaged transfer factors, modified according to the capillary model for mean effective velocity and pore diameter, were seen to be only weakly dependent on structure in packings having negligible rectilinear channels. The skewered cubic packing appears particularly attractive and should be considered for use in the process industry.

20E. Masers and Lasers

AD-A011 765/5GA PC$3 75/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
Numerical Study of a Diffusion-Type Chemical Laser,
William S. King, and Harold Mirels. 15 Jun 75, 50p Rept no. TR-0075(5240-50)-2 SAMSO-TR-75-140
Contract F04701-74-C-0075

Descriptors: *Chemical lasers, *Diffusion, Hydrogen fluoride, Mathematical models, Performance(Engineering), Gas flow, Supersonic flow, Fluid dynamics, Pressure, Fluorine, Hydrogen, Computer programming.
Identifiers: *Hydrogen fluoride lasers.

The theoretical performance of an HF diffusion-type chemical laser is investigated by means of exact numerical solutions for the laminar diffusion of a finite stream of H2 into a semi-infinite stream containing F and a diluent in the presence of an incident coherent radiation field. This flow model corresponds to flow in a single semichannel of a diffusion-type chemical laser. The initial flow velocity, temperature, and hydrogen stream thickness is held constant, and the effect of pressure level, initial fluorine partial pressure, and incident radiation intensity on peak integrated gain, axial extent of the lasing region, laser output power, and chemical efficiency is investigated.

AD-A011 902/4GA PC$3.75/MF$2.25
Wisconsin Univ Madison Dept of Chemistry
Chloroethylene Photochemical Lasers: Vibrational Energy Content of the HCl Molecular Elimination Products,
Michael J. Berry. 30 May 74, 31p AFOSR-TR-75-0926
Grant AF-AFOSR-2423-73
Availability: Pub. in Jnl. of Chemical Physics, v61 n8 p3114-3143, 15 Oct 74.

Descriptors: *Chemical lasers, *Ethylenes, *Chlorinated hydrocarbons, *Photochemical reactions, Ultraviolet spectroscopy, Reaction kinetics, Energy levels, Reprints.

Chemical laser techniques have been used to determine relative photochemical product yields and HCl(v' < or = 4) photoelimination product vibronic state distributions resulting from chloroethylene photolyses at lambda > or = 1550 A. The observed highly nonstatistical distributions are successfully matched by a simple reaction dynamics model. All available spectroscopic, photochemical, and product energy partitioning data are used to formulate a state-to-state photochemical reaction mechanism. (Author)

AD-A011 925/5GA PC$3.75/MF$2.25
Hughes Research Labs Malibu Calif
Excimer Lasers.
Semiannual technical rept. 1 Oct 74-31 Mar 75,
A. J. Palmer. Jun 75, 41p
Contract N00014-75-C-0081, DARPA Order-1807

Descriptors: *Gas lasers, *Potassium, Absorption spectra, Electric discharges, Optical pumping, Xenon, Alkali metals, Complex compounds, Dimers, Emission spectra, Experimental design, Rates.
Identifiers: *Xenon lasers, *Excimers.

The general goals of this program are to identify the required operating conditions for achieving practical net laser gain for an alkali-rare gas laser transition for optical pumping, avalanche discharge pumping and ultraviolet-sustainer discharge pumping, and to demonstrate net laser gain in the laboratory with one of the three pumping techniques. A versatile computer code which contains all relevant gas-kinetic processes, optical pumping processes, and electronic plasma processes has been developed and computes small-signal gain and absorption coefficients versus wavelength due to both alkali-rare gas molecules and alkali dimer molecules. The code is currently operational and is being used at present to guide the discharge and optical pumping experimental studies of the potassium-xenon system. Optical absorption measurements on the K-Xe system have been carried out clearly showing the contribution from both ground state K-Xe molecules and K2 molecules, with a wavelength profile in agreement with that predicted by the model. Fluorescence measurements on the discharge experiment have also been carried out showing both the excimer and dimer states in emission. Attempts are being made to both measure the gain directly using a GaAs probe laser and to achieve laser oscillation on the flashlamp-pumped K-Xe system.

AD-A011 943/8GA PC$7.00/MF$2.25
Rocketdyne Canoga Park Calif
Advanced Chemical Laser Nozzle Concepts.
Final rept. Apr 73-Jun 74,
J. C. Hyde, and S. C. Hurlock. Jun 75, 188p AFWL-TR-74-173
Contract F29601-73-A-0034-0001

Descriptors: *Chemical lasers, *Supersonic nozzles, Infrared spectroscopy, Fabrication, Laser cavities, Hydrogen fluoride, Deuterium compounds, Pressure, Test methods.
Identifiers: Design, *Hydrogen fluoride lasers, Deuterium fluoride.

The purpose of this program was to investigate experimentally the performance characteristics of high-pressure recovery, high-performance, advanced nozzle concepts for supersonic chemical lasers. Tests were conducted at small-scale (1 by 3 inches) sizes using scanning mirrors and a high-spatial-resolution IR spectrometer to examine performance. A small water-cooled pitot probe was used to scan the flowfield at the cavity exit to measure potential pressure recovery. A large-scale version of one of the nozzle configurations was designed and fabricated during this program and tested at the Mesa facility by the Aerospace Corporation. The Mesa results provided size scaling data for projecting Laser Engineering Test Facilities (LETF) results to larger sizes. Screening tests were performed on an advanced nozzle concept which provides increased mixing rates, larger throat dimensions, and decreased fabrication time and cost. The results of the screening tests indicated that the nozzles performed as predicted.

AD-A011 944/6GA PC$5.75/MF$2.25
Eocom Corp Irvine Calif
Laser Wavefront Profiling Techniques for Pulsed Radiation.
Final rept. 2 Jun 72-3 Jan 75,
R. E. Gillespie, R. V. Wick, and A. C. Saxman. Jun 75, 146p AFWL-TR-74-305
Contract F29650-72-C-0736

Descriptors: *Pulsed lasers, Measurement, Power measurement, Output, Neodymium lasers, Wavefronts, Laser beams, Test methods, Data processing, Digital computers, Infrared lasers.
Identifiers: High power lasers, *Laser outputs, Neodymium glass lasers.

The rapidly advancing field of high power laser technology has created the requirement for new advanced diagnostic systems. Many approaches have been used in the past to obtain pulsed laser wavefront profiles all of which are very time consuming and laborious techniques. A critical review was made of the existing approaches and new technologies and techniques were analyzed for application to the measurement problem. The resulting system used a Hartmann plate sampling approach, along with transfer optics and a silicon-vidicon camera for accomplishing the laser radiation measurement, high-speed signal conditioning electronics and a high-speed digital computer/plotter system were used for data acquisition, processing and display. With this system a pulsed laser wavefront can be measured to the required accuracies on a timely basis.

AD-A012 180/6GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Intensity of a Focused Beam in a Turbulent Medium,
Ronald L. Fante. 2 May 74, 4p Rept no. AFCRL-TR-75-0344
Availability: Pub. in Proceedings of the IEEE, p1400-1402 Oct 74.

Descriptors: *Laser beams, *Focusing, Atmospheric motion, Intensity, Distribution, Turbulence, Refractive index, Atmospheres, Optical properties, Light transmission, Reprints.
Identifiers: Focal length.

The effect of the strength of turbulence on the intensity distribution in the focal plane of a focused laser beam is studied.

AD-A012 290/3GA PC$3.75/MF$2.25
Avco Everett Research Lab Inc Everett Mass
Investigations into the Feasibility of High Power Laser Window Materials.
Semiannual technical rept. no. 1,
Jacob L. Zar. 15 Apr 75, 36p AFCRL-TR-75-0264
Contract F19628-75-C-0066, DARPA Order-2806

Descriptors: *Infrared windows, *Infrared optical materials, *Laser materials, Infrared lasers, Diamonds, Calcium fluorides, Optical properties, Absorption(Physical), Test methods, Measuring instruments, Continuous wave lasers, Stresses, Cooling.

A test facility is being constructed for testing laser window material. This will use the focused beam from a 15 kW CW laser at 10.6 micrometers or other available lasers. Provision for cooling the window is included and also instrumentation for measuring optical and mechanical effects. Forty-seven natural diamonds have been tested to find the correlation between the UV absorption spectrum, the IR absorption spectrum and the absorption coefficient beta at 10.6

micrometets. Transparency at .253 micrometer is roughly correlated with low values of beta. A water cooled diamond window holder is described. A specimen of single crystal CaF2 and another of pressure induced recrystalized CaF2 were exposed to a 20 joule, 5 microsec 6.7 x 10 to the 7th power watt/sq cm pulse of 2.8 micrometer laser radiation with no apparent damage.

AD-A012 377/8GA PC-GPO/MF$2.25-NTIS
National Bureau of Standards Washington D C
Laser Induced Damage in Optical Materials: 1974.
Final rept.,
Alexander J. Glass, and Arthur M. Guenther.
Dec 74, 258p Rept no. NBS-SP-414
Proceedings of a Symposium Sponsored by Office of Naval Research, The American Society for Testing and Meterials and by the National Bureau of Standards Held at Boulder, Colorado on 22-23 May 1974. Library of Congress Catalog Card No. 74-26935. Previously announced as COM-75-50003.
Availability: Paper copy available from GPO.

Descriptors: *Laser materials, *Radiation effects, *Meetings, Optical materials, Infrared optical materials, Laser beams, Surface finishing, Machining, Optical glass, Optical coatings, Optical properties, Thin films, Mirrors, Infrared windows, Refractive index, Dielectrics, Zinc selenides, Infrared lasers, Sodium chloride, Potassium chloride, Lanthanum compounds, Lithium compounds, Titanium oxides, Yttrium compounds, Vanadates, Focusing.
Identifiers: Lanthanum chlorides, Lithium chlorides, Yttrium vanadates, Self focusing.

These proceedings report in detail the formal papers presented at the 6th Annual Symposium on Laser Damage in Optical Materials held at the National Bureau of Standards, Boulder, Colorado on May 22 and 23, 1974. The major topics covered were damage at dielectric surfaces, damage due to self-focusing, damage to dielectric coatings, and damage to mirrors and windows in the infrared, as well as theoretical and laser system studies and the reporting of fundamental properties important in the damage process. Furthermore, several papers dealing with improved diagnostic techniques were heard. Because of the growing importance and acceptance of machined components in high power laser systems, a workshop on the machining of optics also was held. Nine papers on various facets of the topic were presented dealing with machining procedures, surface characterization of machined elements, coating of machined components and the polishing and damage resistance of polished, coated, and bare machined metal reflectors.

AD-A012 407/3GA PC$5.25/MF$2.25
Utah Univ Salt Lake City Microwave Device and Physical Electronics Lab
Consolidated Quarterly Report for the Period January 1, 1974 to March 31, 1974.
Technical rept.
31 Mar 74, 125p Rept nos. MDL-Q48, UTEC-MD-74-137
Contracts N00014-69-C-0345, N00014-67-A-0325-0005
Appendix 2 of Semi-annual rept. no. 10, 1 Oct 73-31 Mar 74. Sponsored in part by Contract N00014-67-A-0325-0009 and Grants DA-ARO-D-31-124-71-G111 and PHS-EC-00534.

Descriptors: *Coherent radiation, *Microwave frequency, *Semiconductors, Frequency multipliers, Gas lasers, Carbon dioxide lasers, Infrared lasers, Tuning devices, Optical detectors, Electrooptics, Laser modulators, Gallium arsenides, Traveling wave tubes, Millimeter waves, Image converters, Tunable lasers, Optical waveguides, Indium antimonides, Plasmas(Physics), Dosimeters.
Identifiers: *Plasma diagnostics, Optical modulators, *Parametric oscillators, Second harmonic generation, Dielectric waveguides, *Microwave radiobiology.

The broad purpose of the research activity reported herein is to extend the useful frequency spectrum into the range from microwave frequencies to optical frequencies and to improve existing devices and techniques in the microwave spectrum. At present this objective is being pursued by studies of electron beam devices, quantum electronic devices, plasmas, solid-state devices, and microwave biological studies.

NTIS/PS-75/573/6GA
PC$25.00/MF$25.00
National Technical Information Service, Springfield, Va.
Gas Dynamic Lasers (A Bibliography with Abstracts).
Rept. for 1964-Jun 75,
Kirk G. Werner. Jul 75, 117p*
Supersedes NTIS/PS-75/018.

Descriptors: *Bibliographies, Gas flow, Energy transfer, Carbon dioxide lasers, Chemical lasers, Gas lasers, Gas dynamics, Molecular relaxation, Diffusion, Design, Performance, Abstracts, Nozzle flow.
Identifiers: *Gas dynamic lasers, Carbon dioxide lasers.

The research citations cover kinetic and energy transfer processes, design, and performance of gas and chemical lasers relying on gas dynamic effects for lasing enhancement. Diffusion and flow studies specifically applicable to such lasers are also included. (Contains 112 abstracts)

PAT-APPL-566 160/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Free Expansion Nozzle for Gas Dynamic Lasers.
Patent Application,
Ernie D. Brainwerg. Filed 8 Apr 75, 12p Rept no.

Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Gas dynamic lasers, *Nozzles, Patents, Carbon dioxide lasers, Nitrogen, Expansion, Supersonic flow.
Identifiers: PAT-CL-331-94-5-G, *Patent applications.

The patent application concerns a free expansion nozzle for gas dynamic lasers having a multitude of finely divided free expansion sites. These sites may be in the form of a plurality of minute openings within a plate, or minute spacings between adjacent cylinders, or in the form of a small mesh screen. In any case these expansion sites may be situated within the nozzle section of a gas dynamic laser, thereby providing an easily fabricated, economical means of producing a lasing medium within the optical cavity of the laser.

PATENT-3 886 478
Not available NTIS
Department of the Air Force Washington D C
Multi-Component Flow Injector Pump for a Flowing Gas Laser with Low Output Pressure.
Patent,
Robert W. Milling. Filed 5 Nov 73, patented 27 May 75, 4p Rept nos. PAT-APPL-412 856,
Supersedes AD-164 683.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *Gas lasers, *Chemical lasers, *Gas pumps, *Patents, Gas flow, Nitrogen, Helium, Heat exchangers.
Identifiers: PAT-CL-331-94-5.

According to this patent, use is made of the fact that the primary gas stream in the laser is about 90 percent diluent gas, such as nitrogen or helium, which is normally stored at several thousand pounds per square inch pressure and that this is normally used at a pressure of about 100 pounds per square inch. This pressure difference is used to accelerate solid particles which, after separation from the diluent gas, are used in injector fashion to pump the laser output gas flow up to atmospheric pressure by well-known momentum exchange process.

20F. Optics

AD-A011 692/1GA PC$5.25/MF$2.25
Grumman Aerospace Corp Bethpage N Y
High Average Power Diode Laser Illuminator.
Final rept. May 73-Oct 74,
James T. Fulton, and Irwin Kaplan. May 75, 115p
AFAL-TR-74-162
Contract F33615-73-C-1045

Descriptors: *Gallium arsenide lasers, *Illumination, Semiconductor diodes, Optical equipment, Injection lasers, Arrays, Cryogenics, Cooling, Cylindrical bodies, Infrared detectors.

This program was to develop a high power cooled Gallium Arsenide laser system of 1/2 degree x 1/2 degree field of view without encountering the severe heating problem associated with the fiber optic approach. Through the use of a crossed cylindrical optical system and a spray type cooling assembly, the 30 watt power objective was achieved. A growth potential to about 50 watts is indicated without significant modifications. 100 watts appears feasible with modifications. By limiting the initial cooldown rate, it appears that a significant increase in system operating life is achieved.

AD-A011 706/9GA PC$5.25/MF$2.25
Georgia Inst of Tech Atlanta School of Electrical Engineering
Digital Processing of Synthetic Aperture Optical Imagery.
Final technical rept. Oct 72-Dec 74,
William T. Rhodes. Mar 75, 103p RADC-TR-75-58
Contract F30602-72-C-0409

Descriptors: *Telescopes, *Optical images, *Image processing, Mirrors, Fourier transformation, Computer applications, Transfer functions, Photographic reconnaissance, Photographic equipment, Computerized simulation, Spaceborne, Atmospheric scattering.
Identifiers: *Synthetic aperture array systems, *Aberration, Sensitivity analysis, Atmospheric attenuation.

The synthetic aperture approach offers an attractive method for obtaining high resolution imagery with low mass, space-borne optical telescopes. This report presents a simple but effective method which allows the processing of dilute-array synthetic aperture optical data in such a way that aberration effects, introduced by unspecified improper positioning of telescope mirror segments can be removed. It is especially well-suited to two-mirror-segment synthetic aperture telescopes, which are characterized by low mass and comparatively good signal-to-noise ratio characteristics. Although there are restrictions on the spectral bandwidth allowed in the imaging process, the method can nonetheless be applied to multispectral imagery. Adoption of the method to the imaging of astronomical subjects through the turbulent atmosphere is also discussed.

AD-A011 707/7GA PC$3.75/MF$2.25
Hughes Research Labs Malibu Calif

COAT Measurements and Analysis.
James E. Pearson. May 75, 45p RADC-TR-75-101
Contract F30602-75-C-0001, ARPA Order-1279
See also AD-A006 105.

Descriptors: *Optical radar, *Phased arrays, *Thermal blooming, Lasers, Self organizing systems, Control systems, Gas cells, Electronic equipment, Adaptive systems, Acoustooptics, Wind machines, Test equipment, Computerized simulation, Atmospheric motion, Optical equipment, Target discrimination, Laboratory tests.
Identifiers: COAT(Coherent Optical Adaptive Techniques), Coherent Optical Adaptive Techniques, Atmospheric attenuation.

Compensation for thermal blooming distortions has been studied using multidither coherent optical adaptive techniques (COAT) in scaled laboratory experiments. An 18 element, visible wavelength, COAT systems was able to effect only a small improvement in peak target irradiance for forced-convection blooming. Similar results were observed with a truncated Gaussian beam using a computer simulation which models atmospheric thermal blooming and uses a phase conjugate COAT control algorithm to adjust the transmitted beam phase. Refinements in the experimental apparatus to eliminate buoyancy effects are discussed and a design is presented for incorporating adaptive pointing and focus controls into the COAT system. Two designs for an artificial turbulence generator are presented along with a design for adding adaptive tracking and focus controls to the RADC/COAT system. Preliminary COAT studies without turbulence or blooming but with complex moving targets are reported. Normal COAT system operation is observed with all targets if the receiver has sufficient resolution and if the system signal-to-noise ratio is large enough for stable operation.

AD-A011 716/8GA PC$3.75/MF$2.25
Monsanto Co St Louis Mo Electronics Div
Thin Film Optical Waveguides in III-V Semiconductors.
Semi-annual technical rept. no. 4,
M. George Craford. Jul 74, 34p AFCRL-TR-74-0554
Contract F19628-72-C-0324, DARPA Order-2074
See also report no. 3 dated Jan 74, AD/A003 143.

Descriptors: *Epitaxial growth, *Semiconducting films, *Optical waveguides, Gallium arsenides, Gallium phosphides, Thin films, Coherent radiation, Coherent radiation, Infrared radiation, Electrooptics, Refractive index, Waveguide couplers, Light transmission.
Identifiers: Integrated optics, Optical modulators.

A number of GaAs/GaAsP waveguides have been grown on wafers with maximum dimensions on the order of 7 cm. The surface alloy composition variation is within less than 1%. Waveguide attenuation measurement at 10.6 micrometers gives a 2 dB/cm loss for a single mode waveguide, which is the lowest reported to date. Preliminary result on sandwiched GaAsP/GaAs/GaAsP gives a 6 dB/cm loss for a single mode waveguide. Waveguide work at one micrometer wavelength has been initiated. Light couplings through edge illumination, grating coupler, and prism coupler are successful.

AD-A011 723/4GA PC$4.25/MF$2.25
Raytheon Co Waltham Mass Research Div
Chemical Vapor Deposition of Cadmium Telluride.
Final technical rept. 1 Jun 73-31 Jan 75,
A. W. Swanson, and P. Reagan. Mar 75, 66p
Rept no. S-1836 AFML-TR-75-68
Contract F33615-73-C-5167, ARPA Order-2421

Descriptors: *Cadmium tellurides, *Infrared windows, *Infrared optical materials, Fabrication, Vapor deposition, Chemical reactions, Laser materials, Organometallic compounds, Absorption(Physical), Hardness, Optical properties, Tellurium compounds, Cadmium compounds, Hydrides.
Identifiers: *Chemical vapor deposition, Cadmium/dimethyl, Tellurium/dimethyl, Tellurium hydrides.

Cadmium telluride (CdTe) is a promising material for use as high power laser windows. In the fabrication processes used prior to this work difficulties were experienced in controlling the structural perfection and purity of the material. The chemical vapor deposition process offers the promise of overcoming some of the difficulties experienced to date. The first phase involved the investigation of several processes for the CVD of CdTe. The specific processes investigated and evaluated were: (1) dimethyl cadmium and dimethyl tellurium vapors; (2) dimethyl cadmium and tellurium metal vapors; (3) dimethyl cadmium vapor and H2Te gas; (4) cadmium metal and dimethyl tellurium vapors; and (5) Cd and Te vapors; and (6) H2Te gas and Cd vapor. The second phase involved the task of process optimization. The process parameters which were determined to be of importance were: deposition temperature, furnace pressure, and molar ratio of the reactants. The third phase involved the evaluation and measurement of the various process parameters such as deposition rate and profile, as well as the structure and properties of CdTe.

AD-A011 766/3GA PC$3.25/MF$2.25
Aerospace Corp El Segundo Calif Lab Operations
Isoplanicity for Imaging Through Turbulent Media,
Charles P. Wang. 30 May 75, 17p Rept no. TR-0075(9240-02)-1 SAMSO-TR-75-141
Contract F04701-74-C-0075

Descriptors: *Laser beams, *Optical images, Atmospheric motion, Turbulence, Image processing, High resolution, Transfer functions.
Identifiers: *Atmospheric attenuation.

For optical imaging through turbulence, a measure that specifies how close a given imaging system is to being isoplanic is defined. Its dependence on the spatial resolution, seeing angle, and turbulence structure is given. The results shows that, for low-resolution imaging, the isoplanic condition is usually satisfied, whereas, for diffraction-limited imaging, the isoplanic condition restricts the size of seeing angle.

AD-A011 792/9GA PC$3.25/MF$2.25
California Univ Berkeley Electronics Research Lab
Monolithic Measurement of Optical Gain and Absorption in PbTe,
Peter S. Cross, and W. G. Oldham. 5 Nov 73, 4p AFOSR-TR-75-0914
Contract F44620-71-C-0087, Grant AF-AFOSR-2385-72
Availability: Pub. in Jnl. of Applied Physics, v46 n2 p952-954 Feb 75.

Descriptors: *Optical detectors, Gain, Absorption, Lead alloys, Tellurides, Band theory of solids, Single crystals, Crystal growth, Reprints.

An integrated technique for measuring optical gain and absorption is described. The gain and absorption coefficients are measured as a function of wavelength in PbTe near the direct band gap (about 5.75 micrometers at 77 degrees K). It is possible to measure optical gains of up to 100/cm and absorption coefficients up to 300/cm. The usefulness to a theoretical analysis of the well-correlated gain and absorption data obtained by this method is discussed with a comparison of experimental data with a simple parabolic band theory. (Author)

AD-A011 907/3GA PC$3.25/MF$2.25
Texas Instruments Inc Dallas Central Research Labs
GaAs Optical Stripline.
Technical rept. no. 1, 3 Feb-30 Apr 75,
J. C. Campbell, and F. A. Blum. 23 May 75, 14p
Contract N00014-75-C-0501

Descriptors: *Gallium arsenides, *Optical waveguides, Light modulators, Waveguide couplers, Electrooptics, Schottky barrier devices, Photomasking, Epitaxial growth, Semiconducting films, Switching, Metallizing, Dielectric waveguides.
Identifiers: *Optical modulators, Integrated optics.

The research effort during the first quarter of this program began with development of the required metallization techniques; fabrication of high quality, fine geometry optical photomasks; and initial growth of the required epitaxial GaAs. Bringing these things together, the authors have made the first single-stripline modulators achieving 70% amplitude modulation. They have also completed the initial phase of development of the two-stripline switch by fabrication of passive directional couplers with 3 dB coupling lengths as short as 2 mm.

AD-A011 916/4GA PC$4.75/MF$2.25
Rockwell International Corp Anaheim Calif Electronics Research Div
Integrated Optical Modulators for 10 Micron Wavelengths.
Final rept. 19 Apr 74-28 Feb 75,
D. B. Anderson, R. R. August, J. T. Boyd, and J. E. Coker. 17 Mar 75, 87p Rept no. C73-293.14/501
Contract N00014-73-C-0271
See also AD-778 370.

Descriptors: *Optical waveguides, *Electrooptics, *Light modulators, Laser beams, Carbon dioxide lasers, Infrared lasers, Signal processing, Gallium arsenides, Aluminum compounds, Frequency modulation, Infrared optical materials, Piezoelectric materials, Heterodyning, Transmitter receivers, Surface waves, Traveling waves.
Identifiers: *Optical modulators, Integrated optics, Design.

An infrared integrated optics technology for use in the 10 micrometer region of the spectrum has been developed as reported herein comprising the active signal processing modulation functions (temporal and spatial) as may be applied to a CO2 laser transmitter and heterodyne receiver system. Specifically, a traveling wave electro-optic interaction is considered for the phase modulation requirement while a surface elasto-optic is considered for the frequency shifter requirement. The traveling wave electro-optic interaction has employed waveguide field containment in both transverse dimensions to achieve an efficient interaction. The application of the modulation signal has been implemented using both the slot and strip transmission line configurations containing the optical waveguide for phase matching to achieve wide bandwidth. Heteroepitaxial GaAs is employed as the electro-optic material with a heteroepitaxial (GaAl)As alloy as isolation layers on a substrate of high resistivity GaAs. Devices fabricated have been operated as lumped elements and as traveling wave structures and characterized at 1.15 and 10.6 micrometers.

AD-A011 958/6GA PC$3.25/MF$2.25
California Univ Berkeley

Preferentially Etched Diffraction Gratings in Silicon,
Won-Tien Tsang, and Shyh Wang. 30 Dec 74, 5p ARO-11833.12-EL
Grant DAHC04-74-G-0070
Availability: Pub. in Journal of Applied Physics, v46 n5 p2163-2166 May 75.

Descriptors: *Diffraction gratings, *Etched crystals, Substrates, Silicon, Anisotropy, Gallium arsenides, Masking, Integrated circuits, Grooving, Reprints.
Identifiers: *Preferential etching.

The fabrication of diffraction gratings in the 100 surfaces of silicon by preferential etching is described herein. The gratings thus made have grooves with well-defined geometric shape and bounded by nearly perfect reflecting walls. Meanwhile, the importance of utilizing this technique in integrated optics is also discussed.

AD-A011 978/4GA PC$3.25/MF$2.25
California Univ Los Angeles Dept of Physics
The Optical Properties of LiNbO3,
K. Barner, R. Braunstein, and H. A. Weakliem. 9 Jan 75, 8p ARO-8174.16-P
Grant DA-ARO-D-31-124-72-G131
Availability: Pub. in Physica Status Solidi B, v68 p525-530 1975.

Descriptors: *Lithium compounds, *Niobates, Optical properties, Ferroelectricity, Ultraviolet radiation, Band spectra, Electron transitions, Reprints.
Identifiers: Kramers-Kronig analysis.

The optical constants of LiNbO3 from 0.3 to 14.5 eV are presented from a Kramers-Kronig analysis of the near normal incidence reflectivity spectrum. Comparison with the cubic perovskites suggests that the electronic transitions from 3.5 to 12 eV are between the O(2-) 2p valence band and Nb(4+) d-like conduction band states. Higher transitions are most likely into Li(+) 2s states. Sum rules are applied to calculate the effective number of electrons involved; this number is found to be consistent with the above assignment. Also, the combined density of states function is found to be very similar to that calculated for the analog compound KTaO3.

AD-A011 998/2GA PC$3.75/MF$2.25
Systems Research Labs Inc Dayton Ohio
Servo Stabilization of Two CO2 Lasers 10.7 MHz Apart.
Final rept. Jan-Oct 74
William E. Boney, III, and Joseph E. Brandelik. May 75, 45p AFAL-TR-74-338
Contract F33615-73-C-1069

Descriptors: *Mode locked lasers, *Carbon dioxide lasers, *Frequency stabilizers, Laser modulators, Laser cavities, Frequency modulation, Cadmium tellurides, Mercury compounds, Tellurides, Photodiodes, Infrared lasers, Photodetectors, Heterodyning.
Identifiers: Mercury tellurides.

Two carbon dioxide lasers were stabilized relative to each other by negative feedback, when the two optical cavities were mounted in a common mechanical cavity. With negative feedback, the lasers maintained a relative frequency stability one order of magnitude better than the no feedback, free-running, condition. The feedback system consisted of a HgCdTe detector operating in the photovoltaic mode to provide the beat frequency signal of the two lasers; it included also an inexpensive IC discriminator circuit operating at the FM intermediate frequency of 10.7 MHz, and the appropriate amplification to drive the piezoelectric length control of one laser, and thus modify the absolute frequency of that laser. When the absolute frequencies of the lasers were inverted relative to the negative feedback situation, the feedback system produced positive feedback. With positive feedback, the lasers maintained a frequency stability, relative to each other, of one order of magnitude worse than the no feedback, free-running condition.

AD-A012 038/6GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Diffraction by Edges and Vertices of Interfaces,
Lee Kaminetzky, and Joseph B. Keller. 15 Feb 74, 20p Rept no. EL-48
Contract N00014-67-A-0467-0015
Availability: Pub. in SIAM Jnl. on Applied Mathematics, v28 n4 p839-856 Jun 75.

Descriptors: *Diffraction, *Wave propagation, Refractive index, Dielectrics, Interfaces, Wedges, Conical bodies, Shadows, Transparence, Reprints.

Diffraction of a scalar wave by an edge or vertex of an interface, separating two media of different refractive indices, is considered asymptotically for small wavelengths. This includes diffraction by transparent or dielectric objects such as wedges and cones. First, for a small refractive index difference across the interface, the edge and vertex diffraction coefficients are expanded in powers of this difference. The leading terms are found for edges and vertices of any angle. Second, edges and vertices at which the surfaces include a small angle are treated. These small angle results are valid for any values of the refractive indices, supplementing the authors previous results for large angles and any refractive indices. When the angle and the refractive index difference are both small, our first and second results agree with each other. When the wedge or cone angle is large and the refractive index difference is small, our first result agrees with our previous result. Third, for edges and vertices of any angle and for any refractive indices, the diffraction coefficients are found near shadow boundaries. By using the previous result and the three new results, it is possible to calculate fields diffracted by a large class of interfaces and transparent objects. No other results are known for this type of diffraction. (Author)

AD-A012 203/6GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
Multispectral Laser Line Transmittance through Simulated Natural Particulates. Part I. Instrumentation and Particulate Generation.
Research and development technical rept.,
James Fowler, William Lentz, Radon Loveland, and Gilbert Fernandez. Jun 75, 25p Rept no. ECOM-5564-Pt-1

Descriptors: *Light transmission, *Particulates, *Multispectral, *Laser beams, Lasers, Ultraviolet radiation, Infrared radiation, Visible spectra, Propagation, Aerosols, Aerosol generators, Test facilities.

A series of tests were conducted to determine the effect of high concentrations of natural particulates, as might be associated with military activities, on the transmission of UV, VIS, and IR laser energy through an aerosol test chamber. Part I describes the preparation of particulates to simulate natural conditions, the test chamber and characterization of the particulates suspended in the chamber. (Author)

AD-A012 260/6GA PC$3.25/MF$2.25
Rhode Island Univ Kingston Dept of Electrical Engineering
Optical Waveguides with Noninteracting Beam-Slope Stabilizers,
Steven C. Nardone, James C. Daly, and John E. Spence. 15 Jun 74, 6p ARO-9530.6-EL
Contract DAHC04-71-C-0044
Availability: Pub. in IEEE Transactions on Communications, vCOM-23 n2 p235-239 Feb 75.

Descriptors: *Optical waveguides, Stabilization systems, Beams(Radiation), Slope, Errors, Lenses, Reprints.

Ray position in slope-controlled waveguides is studied. A linear combination of three consecutive position measurements is used to calculate the slope error of the middle lens. This is the error input to the middle lens positioning system. Independent lens correction results and thus a decoupling of space and time response is achieved. The system is shown to be stable. Overshoot in the transient response due to cross coupling between controllers is eliminated. Performance is compared to that of the position-controlled waveguide. Computer simulations indicate that the system is stable in the presence of statistical parameter variations. (Author)

AD-A012 289/5GA PC$6.25/MF$2.25
Raytheon Co Waltham Mass Research Div
Advanced Techniques for Improving Laser Optical Surfaces.
Final rept. 1 Jul 73-28 Feb 75,
Charles B. Willingham, Richard H. Cosgro, Dominic P. Bua , and Morey R. Schapira. Mar 75, 152p Rept no. S-1856 AFCRL-TR-75-0225
Contract F19628-73-C-0280, ARPA Order-2415
See also report dated Sep 74, AD-787 780.

Descriptors: *Laser materials, *Infrared optical materials, *Surface finishing, Zinc selenides, Calcium fluorides, Potassium chloride, Polishes, Abrasives, Ion beams, Radiation effects, Microstructure.

Chemical and chemical-mechanical polishing, ion-beam polishing, bowl-feed and continuously recycled abrasive 'super-polishing' techniques were evaluated for single crystal and polycrystalline potassium chloride and calcium fluoride, and polycrystalline zinc selenide. Optimized conventional grinding and polishing techniques were established for calcium fluoride and zinc selenide. Diamond abrasive polishing, using conventional techniques, was shown to produce superpolished surfaces conveniently and reliably on these materials. Optimized chemical polishing techniques were selected for potassium chloride and zinc selenide, and a potentially useful chemical polish for calcium fluoride was identified. Ion beam polishing was shown to be potentially useful only as a final surface cleaning step, preparatory to antireflection coating deposition.

AD-A012 329/9GA PC$3.25/MF$2.25
Northeastern Univ Boston Mass Dept of Physics
A High Pressure Cell for Far Infrared Spectroscopy Under Truly Hydrostatic Pressures,
R. P. Lowndes. 1974, 7p ARO-10392.11-P
Grant DA-ARO-D-31-124-72-G125
Availablity: Pub. in Proceedings of the International Conference on High Pressure (4th), P805-809 1974.

Descriptors: *Far infrared radiation, *Infrared spectroscopy, High pressure, Hydrostatic pressure, Silicon, Germanium, Infrared windows, Reprints.

A high pressure far infrared cell operating to truly hydrostatic pressures of 8 kbars is described. Results of experiments on the collision induced absorption in nitrogen gas and on the pressure dependence of the q approx. 0 transverse optic phonon frequency and lifetime for TlBr are presented to illustrate the versatility of the cell. (Author)

AD-A012 410/7GA PC$3.75/MF$2.25
Sperry UNIVAC St Paul Minn Defense Systems Div

Stripe Domain Light Deflector,
D. L. Fleming, and T. R. Johansen. 1 Apr 75, 41p
Contract N00014-73-C-0308

Descriptors: *Laser beams, *Deflectors, Optical materials, Yttrium iron garnet, Bismuth, Iron compounds, Chromium compounds, Halides, Crystal growth, Beam steering, Memory devices, Optical radar, Line scanning, Epitaxial growth, Crystal structure, Borates, Nickel compounds, Cobalt compounds.
Identifiers: Optical crystal memories, Liquid phase epitaxy.

The need for a light deflector has become more pressing since the advent of lasers. Such applications as optical memories, a line scan illuminator, or search and track optical radar require a beam steering device. Properties such as high resolution, wide angle deflection - preferably in two dimensions - , high scan rates, high random access rates, and the ability to withstand extreme environments often encountered in tactical situations are sought. The magnetic stripe domain deflector offers important advantages in these respects. The purpose of this contract was to evaluate the prospects of a stripe domain light deflector using such materials as mismuth-doped yttrium iron garnet (Bi: YIG), iron-chromium trihalides, and iron cobalt nickel borates for the green 5145 A Argon line.

N75-23923/6GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Photometry in the 3200-9000 a Range on Board the MARS-5 Automatic Interplanetary Station.
L. V. Ksanfomaliti, and G. N. Krasovskiy. May 75, 7p NASA-TT-F-16347
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 87-91.

Descriptors: *Astronomical photometry, *Light (Visible radiation), *Mars probes, Brightness, Lens design, Radiometers, Wavelengths.

For abstract, see STAR 1315

20G. Particle Accelerators

PATENT-3 886 366 Not available NTIS
Department of the Air Force Washington D C
Compton Back-Scattered Radiation Source. Patent,
Sidney W. Kash. Filed 13 Apr 73, patented 27 [illegible]ay 75, 6p Rept nos. PAT-APPL-350 855, Supersedes AD-164 588.
Government-owned invention available for licensing. Copy of patent available Commissioner of Patents, Washington, D.C. 20231 $0.50.

Descriptors: *X rays, *Sources, *Patents, Electron beams, Compton scattering.
Identifiers: PAT-CL-250-493.

The patent describes an apparatus using the Compton back-scattered technique to produce an intense unidirectional pulsed source of low-energy X-rays. The X-rays are produced by the Compton back-scattering of a beam of low-energy photons with an oppositely-directed, high-energy, high-intensity electron beam.

20H. Particle Physics

AD-A011 738/2GA PC$3.25/MF$2.25
Texas A and M Univ College Station Dept of Physics
On Producing Totally Polarized Electrons through Multiphoton Ionization,
P. Lambropoulos. 20 Nov 73, 4p AFOSR-TR-75-0726
Grant AF-AFOSR-2484-73
Availability: Pub. in Jnl. of Physics B: Atomic and Molecular Physics, v7 n2 pL33-L35 1974.

Descriptors: *Electrons, Polarization, Photoionization, Photoelectrons, Matrix theory, Angular momentum, Reprints.

It is shown that a process for producing totally polarized electrons recently proposed by Farago and Walker can also be obtained as a special case in three-photon ionization of an alkali atom. No dependence of the radial matrix elements on the total angular momentum is necessary, or assumed. (Author)

AD-A011 746/5GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Uniform Asymptotic Expansions in Transport Theory with Small Mean Free Paths, and the Diffusion Approximation,
G. J. Habetler, and B. J. Matkowsky. 30 Oct 73, 10p Rept no. SI-30
Contract N00014-67-A-0467-0027, Grant NSF-GP-27368
Availability: Pub. in Jnl. of Mathematical Physics, v16 n4 p846-854 Apr 75.

Descriptors: *Neutrons, Particle trajectories, Boundary value problems, Diffusion theory, Eigenvectors, Approximation(Mathematics), Reprints.
Identifiers: Transport theory, Asymptotic expansions.

Initial-boundary value and boundary value problems for transport equations are considered in inhomogeneous media. The case is considered when the mean free path is small compared to typical lengths in the domain (e.g., the size of a reactor). Employing the boundary layer technique of matched asymptotic expansions, we derive a uniform asymptotic expansion of the solution of the problem. In so doing we find that in the interior of the domain, i.e., away from boundaries and away from the initial line, the leading term of the expansion satisfies a diffusion equation which is the basis of most computational work in reactor design.

AD-A011 754/9GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. XXV. MINDO/3. An Improved Version of the MINDO Semiempirical SCF-MO Method,
Richard C. Bingham, Michael J. S. Dewar, and Donald H. Lo. 18 Jul 74, 11p AFOSR-TR-75-0873
Contract F44620-71-C-0119
See also AD-A011 755.
Availability: Pub. in Jnl. of the American Chemical Society, v97 n6 p1285-1293, 19 Mar 75.

Descriptors: *Molecules, *Ground state, *Molecular orbitals, Computations, Quantum chemistry, Molecular structure, Reactivities, Heat of formation, Atomization, Reprints.
Identifiers: MINDO molecular orbitals, MINDO/3 molecular orbitals.

The problems involved in attempts to develop quantitative treatments of organic chemistry are discussed. An improved version (MINDO/3) of the MINDO semiempirical SCF-MO treatment is described. Results obtained for a large number of molecules are summarized. (Author)

AD-A011 756/4GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. XXVII. MINDO/3 Calculations for CHON Species,
Richard C. Bingham, Michael J. S. Dewar, and Donald H. Lo. 18 Jul 74, 8p AFOSR-TR-75-0875
Contract F44620-71-C-0119
See also AD-A011 757.
Availability: Pub. in Jnl. of the American Chemical Society, v97 n6 p1302-1306, 19 Mar 75.

Descriptors: *Molecules, *Ground state, *Molecular orbitals, Computations, Carbon, Hydrogen, Oxygen, Nitrogen, Heat of formation, Geometry, Dipole moments, Chemical bonds, Reprints.
Identifiers: MINDO molecular orbitals, MINDO/3 molecular orbitals.

The MINDO/3 method has been tested by calculations for a wide range of compounds derived from C, H, O, and N. The calculated heats of formation, molecular geometries, and dipole moments agree quite well with experiment; errors occur in compounds where hydrogen atoms are crowded together, where triple bonds are present, or where adjacent pairs of atoms have unshared pairs of electrons. The worst errors of MINDO/2 and MINDO/2' are, however, avoided; thus good results are obtained for diatomic molecules and heteroaromatic compounds. (Author)

AD-A011 757/2GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. XXVIII. MINDO/3 Calculations for Compounds Containing Carbon, Hydrogen, Fluorine, and Chlorine,
Richard C. Bingham, Michael J. S. Dewar, and Donald H. Lo. 18 Jul 74, 7p AFOSR-TR-75-0876
Contract F44620-71-C-0119
See also AD-A011 758.
Availability: Pub. in Jnl. of the American Chemical Society, v97 n6 p1307-1311, 19 Mar 75.

Descriptors: *Molecules, *Ground state, *Molecular orbitals, Carbon, Hydrogen, Fluorine, Chlorine, Computations, Heat of formation, Geometry, Dipole moments, Ionization potentials, Reprints.
Identifiers: MINDO molecular orbitals, MINDO/3 molecular orbitals.

MINDO/3 calculations are reported for a number of compounds containing fluorine or chlorine. The calculated heats of formation, geometries, dipole moments, and first ionization potentials are in generally satisfactory agreement with experiment. (Author)

AD-A011 758/0GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Ground States of Molecules. XXIX. MINDO/3 Calculations of Compounds Containing Third Row Elements,
Michael J. S. Dewar, Donald H. Lo, and Christopher A. Ramsden. 18 Jul 74, 11p AFOSR-TR-75-0877
Contract F44620-71-C-0119
See also AD-A011 757.
Availability: Pub. in Jnl. of the American Chemical Society, v97 n6 p1311-1318, 19 Mar 75.

Descriptors: *Molecules, *Ground state, *Molecular orbitals, Silicon, Phosphorus, Sulfur, Heat of formation, Geometry, Ionization potentials, Chemical bonds, Energy, Benzene, Computations, Reprints.
Identifiers: MINDO molecular orbitals, MINDO/3 molecular orbitals.

MINDO/3 calculations are reported for a variety of neutral molecules and positive ions containing the third row elements Si, P, or S. The calculated heats of formation, molecular geometries, and ionization potentials are in satisfactory agreement with experiment. Estimates of the Pi bond energies of multiple bonds involving silicon, and of the resonance energies of silabenzenes, are reported. Proton affinitives of analogous compounds of second and third row compounds are compared. (Author)

AD-A011 759/8GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Photoelectron Spectra of Molecules. VI. Hyperconjugation Versus P sub PI-d sub PI Bonding in Group IVb Compounds,
P. K. Bischof, M. J. S. Dewar, D. W. Goodman, and T. B. Jones. 14 Nov 73, 12p AFOSR-TR-75-0789

Contract F44620-71-C-0119
See also AD-760 972.
Availability: Pub. in Jnl. of Organometallic Chemistry, v82 p89-98 1974.

Descriptors: *Photoelectrons, *Group II-VI compounds, *Metalorganic compounds, Molecular spectroscopy, Ionization potentials, Organometallic compounds, Bonding, Helium, Perturbation theory, Reprints.

Helium (I) photoelectron spectra have been obtained for the compounds (CH3)3MPH and (CH3)3MCH2Ph (M = Group IV metal). The results have been partitioned by first order perturbation theory into hyperconjugation, induction and in the phenyl derivatives p sub pi-d sub pi bonding.

AD-A011 820/8GA PC$3.25/MF$2.25
Armed Forces Radiobiology Research Inst Bethesda Md
Photonuclear Production of Potassium-38,
C. M. Cole, F. C. Gray, G. M. Meaburn, and J. S. Stevenson. Mar 75, 14p Rept no. AFRRI-TN75-2

Descriptors: *Potassium, *Photonuclear reactions, Medical research, Radioactive isotopes.
Identifiers: *Potassium 38, In vivo analysis.

Radioactive potassium-38 has been produced by the photonuclear reactions 39K (gamma,n) 38K and 40Ca (gamma,np) 38K using the bremsstrahlung field developed by an electron linear accelerator. Noncarrier-free 38K was produced by irradiating potassium hydroxide pellets for 30 minutes using 10 kW of 40 MeV electrons passing through a thick tantalum converter. Yields of 50-70 mCi 38K per gram KOH irradiated were obtained. Carrier-free 38K was produced by similarly irradiating shredded calcium metal, obtaining 1-3 mCi per gram of calcium. In both cases, the target material was dissolved in HCl, neutralized and prepared as sterile solutions of KCl for injection.

AD-A011 847/1GA PC$10.50/MF$2.25
Mathematical Applications Group Inc Elmsford N Y
SAM-CE: A Three Dimensional Monte Carlo Code for the Solution of the Forward Neutron and Forward and Adjoint Gamma Ray Transport Equations. Revision C,
Martin O. Cohen, Eugene Troubetzkoy, Henry Lichtenstein, Herbert Steinberg, and Mendel Beer. 31 Jul 74, 409p Rept no. MR-7021-Rev-C DNA-2830F-Rev-C
Contract DNA001-74-C-0040

Descriptors: *Neutron transport theory, *Gamma rays, *Nuclear radiation, *Computer programming, Transport properties, Monte Carlo method, Radiation shielding, Computations, FORTRAN.
Identifiers: *SAM-CE computer code, *Gamma ray transport theory, Combinatorial geometry.

The SAM-CE system is a FORTRAN Monte Carlo computer code designed to solve the time-dependent neutron and gamma ray transport equations in complex three-dimensional geometries. SAM-CE is applicable for forward neutron calculations and for forward as well as adjoint primary gamma ray calculations. In addition, SAM-CE is applicable for the gamma ray stage of the coupled neutron-secondary gamma ray problem, which also may be solved in either the forward or the adjoint mode.

AD-A011 896/8GA PC$3.25/MF$2.25
Northwestern Univ Evanston Ill Dept of Physics
Augmented-Plane-Wave Calculation of Indirect-Exchange Matrix Elements for Gadolinium,
B. N. Harmon, and A. J. Freeman. 22 May 74, 8p AFOSR-TR-75-0739
Grant AF-AFOSR-2012-71
Availability: Pub. in Physical Review B, v10 n12 p4849-4855, 15 Dec 74.

Descriptors: *Gadolinium, *Plane waves, Computations, Electrons, Wave functions, Exchange, Hamiltonian, Reprints.
Identifiers: Exchange matrix elements.

The exchange matrix elements between a local 4f moment and the conduction electrons (Ruderman-Kittel-Kasuya-Yosida exchange) have been calculated for paramagnetic gadolinium metal using nonrelativistic augmented-plane-wave wavefunctions. The magnitude of the matrix elements is found to be largest for d-like conduction electrons and is quite sensitive to their angular distribution.

AD-A011 900/8GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge Dept of Chemistry
Temperature Dependence of Near-Resonant Vibration - Rotation Energy Transfer,
D. Frankel, J. I. Steinfeld, R. D. Sharma, and L. Poulsen. 7 Jun 74, 7p AFOSR-TR-75-0924
Grants AF-AFOSR-2032-71, AF-AFOSR-2475-73
Availability: Pub. in Chemical Physics Letters, v28 n4 p485-489, 15 Oct 74.

Descriptors: *Energy transfer, *Temperature, *Vibration, *Rotation, *Boron compounds, Chlorides, Reprints.
Identifiers: Boron trichloride.

V-R,T deactivation of the Upsilon sub 4 (243/cm) level in BCl3 by HCl has been measured over the range 220-340 K, with an infrared double resonance technique. The deactivation probabilities show an inverse temperature dependence below room temperature, indicating that long-range attractive forces are important in the resonant transfer process. The results are compared with the theory of Sharma and Brau. (Author)

AD-A011 976/8GA PC$3.25/MF$2.25
Connecticut Univ Storrs Dept of Physics
Ionization in Low-KeV-Energy Ar+Ar Collisions,
F. J. Eriksen, S. M. Fernandez, A. B. Bray, and E. Pollack. 2 Dec 74, 7p ARO-10644.7-P
Grant DA-ARO-D-31-124-73-G7
Availability: Pub. in Physical Review A, v11 n4 p1239-1244 Apr 75.

Descriptors: *Particle collisions, Inelastic scattering, Ionization potentials, Atomic energy levels, Ion exchange, Energy transfer, Argon, Ion beams, Reprints.

AD-A012 253/1GA PC$3.25/MF$2.25
New York Univ N Y Dept of Physics
Coherent Optical Transient Study of Molecular Collisions: Theory and Observation,
Paul R. Berman. 24 Oct 74, 23p ARO-10895.5-P
Contract N00014-72-C-0153, Grant DA-ARO-D-31-124-73-G128
Availability: Pub. in Physical Review A, v11 n5 p1668-1688 May 75.

Descriptors: *Particle collisions, *Molecules, Molecular energy levels, Molecular rotation, Gases, Excitation, Coherent optical radiation, Methyl radicals, Fluorides, Photons, Reprints.
Identifiers: Molecular collisions, Elastic collisions.

It has been shown recently that molecular gas samples excited with coherent light can display a variety of transient phenomena, similar to those found in nuclear magnetic resonance. This article elucidates how these coherence effects can be used to isolate or unfold molecular collision mechanisms that normally remain hidden within the optical line shape.

AD-A012 388/5GA PC$4.75/MF$2.25
Naval Research Lab Washington D C
Nuclear Magnetic Dipole Transitions Excited by Backward Angle Scattering,
Lawrence W. Fagg. 9 Jun 75, 84p Rept no. NRL-7878

Descriptors: *Electron scattering, *Nuclear structure, Nuclear magnetic moments, Magnetic dipoles, Electron beams.
Identifiers: *Electroexcitation, Electromagnetic interactions.

The field of electroexcitation of nuclear M1 transitions is reviewed. The subject is introduced with an elementary description of the relationship between backward-angle electron scattering and M1 excitation. Data analysis methods as well as 180 degree electron scattering techniques are also treated. The discussion of experimental results emphasizes the strength of the spin-flip transition, the concentration of M1 strength in self-conjugate nuclei, the degree of fragmentation of this strength in other nuclei, and the response of odd-A rotational nuclei and heavy nuclei to 180 degree electron scattering.

N75-24445/9GA PC$3.25/MF$2.25
Fisk Univ., Nashville, Tenn. Dept. of Physics.
Properties of Scattering Amplitudes at Very High Energies.
Final Technical Report, 1 Jun. 1974 - 1 Jun. 1975.
R. E. Mickens. 1 Jun 75, 5p NASA-CR-142762
Grant NSG-8007

Descriptors: *Scattering amplitude, *Scattering cross sections, Asymptotes, Elastic scattering, Forward scattering, High energy interactions, Neutrinos.

For abstract, see STAR 1315

N75-24447/5GA PC$4.25/MF$2.25
Grenoble Univ. (France). Inst. des Sciences Nucleaires.
Manual for the Use of Particle Trajectories Programs to First Order of the Optic Series.
J. Ferme. 15 May 74, 70p ISN-74-12
In French; English Summary.

Descriptors: *Magnets, *Optics, *Particle trajectories, *User manuals (Computer programs), Input/output routines, Pdp 9 computer.

For abstract, see STAR 1315

N75-24456/6GA PC$3.75/MF$2.25
Montpellier Univ. (France). Dept. de Physique Mathematique.
Leptons Production in Hadronic Collisions, Partons, Vector Mesons and New Particles.
F. M. Renard. Feb 75, 31p PM/75/3

Descriptors: *Hadrons, *Leptons, *Pair production, *Particle collisions, *Partons, *Vector mesons, Annihilation reactions, Bremsstrahlung, High energy interactions, Inelastic scattering, Photons, Quarks.

For abstract, see STAR 1315

N75-24457/4GA PC$3.25/MF$2.25
Montpellier Univ. (France). Dept. de Physique Mathematique.
A Modified Parton Model for Reactions with Time-Like Photons.
J. Layssac, and F. M. Renard. Feb 75, 8p PM/75/4

Descriptors: *Annihilation reactions, *Mathematical models, *Partons, *Photons, *Quarks, Antiparticles, Hadrons, High energy interactions, Inelastic scattering, Leptons, Pair production, Positron annihilation.

For abstract, see STAR 1315

N75-24458/2GA PC$3.25/MF$2.25
Montpellier Univ. (France). Dept. de Physique Mathematique.
Remarks About the Decays phi into phi Plus 2 Pions and phi into omega Plus 2 Pions.
F. M. Renard. Feb 75, 7p PM/75/5

Descriptors: *Coupling coefficients, *Decay, *Omega-mesons, *Pions, Hadrons, High energy interactions, Meson resonances, Vector mesons.

For abstract, see STAR 1315

20I. Plasma Physics

AD-A011 684/8GA PC$5.25/MF$2.25
Tel-Aviv Univ (Israel) Dept of Applied Mathematics
Discontinuous Magnetofluidynamic Flows.
Final scientific rept. 1972-3,
Nima Geffen. 1975, 103p AFOSR-TR-75-0823
Grant AF-AFOSR-2369-72

Descriptors: *Magnetohydrodynamics, Magnetic pinch, Supersonic flow, Shock waves, Partial differential equations, Numerical integration, Israel.

Investigations of Magnetofluidynamic flows with shock waves have been carried-out by analytical numerical and graphical methods, with a simple experiment added to demonstrate an anlogy between plasma and magnetohydraulic flows. Solutions are given for flows around bodies and in given regions of the type prevalent in space research and technology, in hypersonic flight, where the fluid adjacent to the craft gets ionized, and in plasma configurations considered for thermonuclear fission, e.g. theta - pinches, the Tokomak. The conducting-liquid analysis and experiments are applicable to MHD pumps and motors and to the liquid-sochium cooling system for atomic breeder-reactors.

AD-A011 685/5GA PC$3.75/MF$2.25
Texas Tech Univ Lubbock Dept of Electrical Engineering
Dense Plasma Heating and Radiation Generation.
Interim scientific rept.,
M. Kristiansen, and M. O. Hagler. 31 Dec 74, 50p Rept no. SR-1 AFOSR-TR-75-0849
Grant AF-AFOSR-2639-74

Descriptors: *Plasmas(Physics), *Laser beams, Carbon dioxide lasers, Nuclear fusion, Magnetic pinch, Pulsed lasers.
Identifiers: *Plasma heating.

The investigations under this grant consist of three parts: CO2 laser heating of dense preformed plasmas, interaction of a dense hot plasma with a small solid pellet, and pulsed power systems and technology. The laser plasma heating experiment has demonstrated both beam guiding by the plasma and plasma heating by the beam. These results will be useful in heating plasmas for radiation generation. Experiments have shown that the pellet-plasma interaction can be enhanced by irradiating the pellet with a laser shortly before the interaction begins. This result is relevant to improving the efficiency with which the energy in a hot dense plasma can be converted to radiation. The pellet-plasma interaction effort also includes several sub-investigations related to pulsed power technology development.

AD-A011 796/0GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Physics
Radio-Frequency Fields in Magnetoactive Plasma,
C. R. Skipping, D. H. McDaniel, and M. E. Oakes. 2 Oct 73, 7p AFOSR-TR-75-0729
Contract F44620-71-C-0091
Availability: Pub. in Jnl. of Applied Physics, v45 n8 p3374-3379 Aug 74.

Descriptors: *Plasma medium, *Magnetic pinch, *Magnetohydrodynamic generators, Electric fields, Cyclotron resonance phenomena, Fourier transformation, Reprints.

Electric field components produced by a single-turn current sheet concentric with a finite magnetoactive plasma cylinder are calculated for frequencies corresponding to resonant peaks in the series loading resistance near the lower hybrid resonance. The radial electric fields are found to be quite large and to penetrate well into the plasma. Axial electric fields are not negligible for a variety of conditions. Expressions for the field components permit calculations for any azimuthally symmetric distribution of current in the sheet. (Author)

AD-A011 815/8GA PC$3.25/MF$2.25
Naval Research Lab Washington D C
A Test for the Viability of Fluid Codes in the Collisionless Regime.
Interim rept.,
W. M. Manheimer, P. Liewer, M. Lampe, R. Clark, and K. R. Chu. May 75, 25p Rept no. NRL-MR-3053

Descriptors: *Plasmas(Physics), Fluid flow, Electron beams, Magnetic pinch, Mathematical models.

A collisionless unmagnetized plasma can multistream. Therefore, it is not clear to what extent fluid codes can be used to describe its motion. A simple test is presented here which shows when a collisionless plasma multistreams. If a temperature equation formulation of the energy equation is used, it is shown that the system continuously and unavoidably loses energy when multistreaming occurs.

AD-A012 138/4GA PC$3.25/MF$2.25
California Univ Los Angeles School of Engineering and Applied Science
Destabilization of Hydromagnetic Drift-Alfven Waves in a Finite-Beta Collisional Plasma,
J. T. Tang, N. C. Luhmann, Jr., Yasushi Nishida, and Kazushige Ishii. 7 Oct 74, 5p AFOSR-TR-75-0794
Grant AF-AFOSR-2339-72
Availability: Pub. in Physical Review Letters, v34 n2 p70-73, 13 Jan 75.

Descriptors: *Magnetohydrodynamic waves, *Plasma medium, Collisions, Drift, Magnetohydrodynamics, Steady state, Coupling(Interaction), Instability, Dispersion relations, Electrons, Reprints.
Identifiers: Alfven waves.

When an axial electron current is drawn along the magnetic field, there has been observed experimentally the destabilization of both the Alfven and the drift branches of the hydromagnetic, coupled drift-Alfven wave in a steady state high-density collisional plasma. The measured dispersion relation is in good agreement with solutions of theoretical dispersion relations.

AD-A012 190/5GA PC$3.25/MF$2.25
Massachusetts Univ Amherst Dept of Electrical and Computer Engineering
An Experimental Study of a Radial Coaxial Gaseous Discharge,
L. J. Turgeon, and R. E. McIntosh. 30 Mar 73, 8p AFOSR-TR-75-0782
Grant AF-AFOSR-2763-75
Availability: Pub. in IEEE Transactions on Plasma Science, vPS-1 n3 p84-90 Sep 73.

Descriptors: *Plasmas(Physics), *Gas discharges, Coaxial cables, Langmuir probes, Transmission lines, Microwave interferometry, Electrons, Collisions, Reprints.
Identifiers: *Plasma diagnostics.

Experimental measurements of a radial coaxial gaseous discharge were made using an adjustable Langmuir probe and a microwave interferometer. Excellent agreement of these results is observed when inhomogeneities of both the electron number density and temperature are accounted for and the electron-neutral collisions are assumed to be 'hard-sphere' collisions. (Author)

AD-A012 250/7GA PC$4.75/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
An Ablation Technique for Enhancing Reentry Antenna Performance; Flight Test Results.
Physical sciences research papers,
Dallas T. Hayes, Sheldon B. Herskovitz, John F. Lennon, and J. Leon Poirier. 14 Nov 74, 78p
Rept nos. AFCRL-TR-74-0572, AFCRL-PSRP-611

Descriptors: *Plasma control, *Atmosphere entry, *Reentrant electronics, *Ablation, Tetrafluoroethylene resins, Ablative materials, Nose caps, Reentry vehicles, Electron density, Reduction, Radio transmission, Attenuation, S band, Radio interference, Electrostatic probes, Spacecraft antennas.
Identifiers: Teflon.

To develop alternative solutions to Air Force problems relating to signal transmission in the presence of ionization, AFCRL undertook an extensive investigation of techniques for modifying reentry plasmas. The program included laboratory tests and a series of reentry flight experiments. This report describes the flight test of one successful technique, Teflon ablation, a passive approach that requires no internal support systems. A reentry vehicle fitted with a Teflon-coated nosecap was instrumented to measure antenna impedance mismatch, interantenna coupling, signal attenuation, and charged-particle density. The probe data showed that the local boundary-layer electron density decreased by as much as a factor of 200. The Teflon coating effected a 25-dB decrease in S-band signal attenuation. High-power antenna breakdown was modified by the presence of the ablation products. Details of the vehicle design, flight dynamics, and ablation, are presented, and the results of the Teflon-ablation technique are contrasted with those of a successful liquid-injection technique that was tested on a previous flight. (Author)

N75-24477/2GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Absolute Intensity of Radiation Emitted by Uranium Plasmas.
N. W. Jalufka, J. H. Lee, and D. R. Mcfarland. Apr 75, 8p NASA-TM-X-71942

Descriptors: *Plasma radiation, *Radiant flux density, *Uranium plasmas, Fissionable materials, Graphs (Charts), Nuclear reactors, Reactor cores.

For abstract, see STAR 1315

N75-24478/0GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.

Determination of Electron Temperature in a Penning Discharge by the Helium Line Ratio Method.
R. W. Richardson. 1975, 21p NASA-TM-X-71677, Ec8271
Conf-Presented at the 2ND Intern. Conf. On Plasma Sci., Ann Arbor, Mich., 14-16 May 1975; Sponsored by IEEE.

Descriptors: *Electron energy, *Helium ions, *Line spectra, *Penning discharge, Electron density (Concentration), Energy distribution, Plasma diagnostics, Steady state.

For abstract, see STAR 1315

N75-24479/8GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Initial Operation of Siemens Superconducting Prototype Magnet W VII at the Plasma Physics Institute.
W. Amenda, D. Kullman, P. Krueger, and M. Pillsticker. Apr 75, 21p NASA-TT-F-16291, IPP-4/120
Tran-Transl. Into English from Garching bei Munchen (W. Germany), Report Ipp 4/120, Aug. 1974 p 1-17.

Descriptors: *Magnet coils, *Plasma physics, *Superconducting magnets, Coils, Cryogenic equipment, Liquid helium, Magnetic fields.

For abstract, see STAR 1315

N75-24481/4GA PC$3.75/MF$2.25
Ecole Polytechnique Federale de Lausanne (Switzerland). Centre de Recherches en Physique des Plasmas.
Generation of Monochromatic Electrostatic Waves of Large Amplitudes in a Bounded Beam-Plasma System.
M. Bitter, and P. J. Paris. Dec 74, 35p LRP-88/74

Desc..ptors: *Argon plasma, *Electron beams, *Electrostatic waves, *Plasma interactions, Coupling, Magnetically trapped particles, Nonlinearity, Plasma generators, Plasma physics, Wave propagation.

For abstract, see STAR 1315

N75-24482/2GA PC$3.75/MF$2.25
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
The Balance of Rotating Plasma Slabs.
T. Hellsten. Nov 74, 26p TRITA-EPP-74-19

Descriptors: *Deuterium plasma, *Hydrogen plasma, *Plasma heating, *Rotating plasmas, Approximation, Boundary value problems, Crossed fields, Magnetically trapped particles, Mathematical models, Plasma cylinders, Plasma diffusion, Plasma slabs, Steady state.

For abstract, see STAR 1315

N75-24483/0GA PC$3.25/MF$2.25
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
The Flux of Particle Loss in a Permeable Plasma.
B. Lehnert. 6 Nov 74, 15p TRITA-EPP-74-20

Descriptors: *Ion production rates, *Magnetically trapped particles, *Plasma control, *Scaling laws, *Steady state, Plasma diffusion, Plasma loss, Plasma temperature, Plasma-particle interactions, Pressure distribution.

For abstract, see STAR 1315

N75-24484/8GA PC$4.25/MF$2.25
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics.
Electron Plasma Oscillations in a Static Electric Field.
C. Wahlberg. Dec 74, 65p TRITA-EPP-74-21

Descriptors: *Collisionless plasmas, *Electric fields, *Electron plasma, *Plasma oscillations, *Wave amplification, Adiabatic conditions, Cold plasmas, Damping, Phase shift, Static electricity, Time dependence, Vlasov equations.

For abstract, see STAR 1315

N75-24485/5GA PC$3.25/MF$2.25
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
On Tornado Traps Operated as Rotating Plasma Devices.
B. Lehnert. 6 Dec 74, 12p TRITA-EPP-74-22

Descriptors: *Magnetic field configurations, *Plasma control, *Plasma heating, Critical velocity, Crossed fields, High speed, Plasma temperature, Rotating plasmas, Tornadoes, Trapped magnetic fields.

For abstract, see STAR 1315

N75-24486/3GA PC$3.25/MF$2.25
Royal Inst. of Tech., Stockholm (Sweden). Dept. of Plasma Physics and Fusion Research.
Plasma Equilibrium in External Ring Systems.
T. Hellsten. Dec 74, 21p TRITA-EPP-74-23

Descriptors: *Iterative solution, *Magnetically trapped particles, *Plasma control, *Plasma-electromagnetic interaction, *Systems stability, Current density, Equilibrium, Ring currents, Surface geometry, Toroidal plasmas.

For abstract, see STAR 1315

20J. Quantum Theory

AD-A011 737/4GA PC$3.25/MF$2.25
Massachusetts Inst of Tech Cambridge
Thermoabsorption in SnO2,
R. D. McRoberts, C. G. Fonstad, and D. Hubert. 29 Jul 74, 8p AFOSR-TR-75-0857
Grant AF-AFOSR-2493-73
Availability: Pub. in Physical Review B, v10 n12 p5213-5219, 15 Dec 74.

Descriptors: *Tin compounds, *Oxides, *Light transmission, Crystals, Temperature, Modulation, Solid state electronics, Reprints.
Identifiers: *Thermoabsorption.

AD-A011 794/5GA PC$3.25/MF$2.25
Chicago Univ Ill James Franck Inst
Time Dependent Approach to Semiclassical Dynamics,
Eric J. Heller. 9 Sep 74, 12p AFOSR-TR-75-0879
Contract F44620-73-C-0005
Availability: Pub. in Jnl. of Chemical Physics, v62 n4 p1544-1555, 15 Feb 75.

Descriptors: *Quantum theory, *Wave packets, Molecules, Particle collisions, Scattering, Time dependence, Reprints.
Identifiers: *Semiclassical dynamics, Molecular collisions.

This paper develops a new approach to semiclassical dynamics which exploits the fact that extended wavefunctions for heavy particles (or particles in harmonic potentials) may be decomposed into time-dependent wave packets, which spread minimally and which execute classical or nearly classical trajectories. A Gaussian form for the wave packets is assumed and equations of motion are derived for the parameters characterizing the Gaussians.

AD-A011 954/5GA PC$3.25/MF$2.25
California Inst of Tech Pasadena Arthur Amos Noyes Lab of Chemical Physics
Electronic Structure of Re2Cl8(--),
Albert P. Mortola, Jules W. Moskowitz, Charles D. Cowman , Harry B. Gray, and Notker Roesch. 22 Aug 74, 5p Rept no. Contrib-4946 ARO-8389.15-C
Grants DA-ARO-D-31-124-72-G116, NSF-GP-10331
Availability: Pub. in Chemical Physics Letters, v32 n2 p283-286, 15 Apr 75.

Descriptors: *Rhenium compounds, *Chlorides, *Quantum chemistry, Energy levels, Electron transitions, Excitation, Absorption spectra, Single crystals, Reprints.

AD-A011 956/0GA PC$3.25/MF$2.25
North Carolina Univ Chapel Hill Dept of Chemistry
Photochemistry of Transition Metal Complexes. The Mechanism and Efficiency of Energy Conversion by Electron-Transfer Quenching,
C. R. Bock, T. J. Meyer, and D. G. Whitten. 4 Dec 74, 5p ARO-8168.13-C
Grants DAHC04-74-G-0025, NSF-GP-42846X
Availability: Pub. in Jnl. of the American Chemical Society, v97 n10 p2909-2911, 14 May 75.

Descriptors: *Complex compounds, *Ruthenium compounds, *Pyridines, *Quenching(Inhibition), *Photochemical reactions, *Electron transfer, Excitation, Energy conversion, Metalorganic compounds, Transition metals, Reprints.

A study of electron transfer quenching of Ru(bipy)3(2+) by a series of compounds having variable reduction potentials is reported. These results present a detailed picture of the excited state electron transfer process and indicate that energy conversion is an extremely efficient process for Ru(bipy)3(2+).

AD-A012 029/5GA PC$3.75/MF$2.25
Stanford Univ Calif
Observation of Stimulated Emission of Radiation by Relativistic Electrons in a Spatially Periodic Transverse Magnetic Field.
Final rept.,
Luis Elias, William Fairbank, John Madey, H. Alan Schwettman, and Todd Smith. Jun 75, 44p AFOSR-TR-75-0827
Grant AF-AFOSR-2790-75

Descriptors: *Electron beams, Tunable lasers, Infrared lasers, Magnetic fields, Gain, Frequency modulation.
Identifiers: *Stimulated emission, Relativistic electrons, Electron photon interactions.

Gain has been observed at 10.6 micrometers due to stimulated emission of radiation by relativistic electrons in a spatially periodic transverse magnetic field. The magnitude of the measured gain is close to the theoretical value for the stimulated emission process. The dependence of the gain on electron energy and current and on the polarization of the stimulating radiation are also consistent with the stimulated emission hypothesis. The results raise the possibility that this mechanism can be used in the development of a new class of tuneable high power lasers.

AD-A012 034/5GA PC$3.25/MF$2.25
Missouri Univ Rolla Dept of Physics
Lifetimes of the A(Superscript 2) pi State of CO(+) and the A(Superscript 2) delta State of CH.
Technical rept.,
Richard Anderson, and Mark Jursich. 10 Jun 74, 5p Rept no. TR-7
Contract N00014-69-A-0141-0004
Availability: Pub. in American Jnl. of Physics, v43 n6 p535-537 Jun 75.

Descriptors: *Carbon monoxide, *Hydrocarbons, *Excitation, Life expectancy, Chemical radicals, Quenching(Inhibition), Quantum chemistry, Reprints.
Identifiers: *Methenyl.

AD-A012 037/8GA PC$3.25/MF$2.25
Princeton Univ N J Dept of Chemistry
High-Energy Optical-Absorption Bands of Transition-Metal Ions in Fluoride Host Crystals,
Joseph F. Sabatini, Arthur E. Salwin, and Donald S. McClure. 2 Dec 74, 10p
Contract N00014-67-A-0151-0012
Availability: Pub. in Physical Review B, v11 n10 p3832-3841, 15 May 75.

Descriptors: *Calcium fluorides, *Magnesium compounds, *Potassium compounds, *Fluorides, *Transition metals, *Absorption spectra, Single crystals, Impurities, Quantum chemistry, Reprints.

AD-A012 121/0GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia Dept of Physics
Observation of Magnetoplasma Type Surface Polaritons on n-InSb.
Technical rept.,
A. Hartstein, and E. Burstein. 25 Jan 74, 8p Rept no. TR-54
Summary in French.
Availability: Pub. in Solid State Communications, v14 p1223-1227 1974.

Descriptors: *Quantum theory, *Wave propagation, *Semiconductors, Indium antimonides, Air, Interfaces, Surface properties, Dispersion relations, Reprints.
Identifiers: *Magnetoplasmas, *Polaritons, Surface defects, *Surface polaritons, Magnetic plasmons, ATR(Attenuated total reflection), Attenuated total reflection.

Surface polariton dispersion curves have been obtained for an n-InSb-air interface in a magnetic field using the ATR method and are found to be in qualitative agreement with theory. In particular, the curves show the predicted nonreciprocal nature of the surface polariton propagation, and the appearance of virtual excitation type branches of the dispersion curves. On the basis of data obtained in zero magnetic field on etched surfaces the quantitative differences between experimental and theoretical dispersion curves are attributed to surface damage. (Author)

AD-A012 125/1GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia Dept of Physics
Propagation of Surface Polaritons at Optical Frequencies over Macroscopic Distances along Semi-Infinite Interfaces.
Technical rept.,
J. Schoenwald, and E. Burstein. 1972, 8p Rept no. TR-56
Availability: Pub. in Proceedings of Taorima Conference on Polaritons, p139-145 1972.

Descriptors: *Quantum theory, *Wave propagation, *Coherent radiation, *Far infrared radiation, Prisms(Optics), Surface properties, Interfaces, Air, Dielectrics, Metals, Radiation attenuation, Reprints.
Identifiers: *Surface polaritons, *Polaritons, Surface modes.

We have recently reported the observation of surface polariton propagation at metal-air interfaces over macroscopic distances (centimeters) at optical frequencies (10.6 micrometers). A prism coupling technique was used both to excite and detect the surface polaritons. The propagation length of the surface mode was found by measuring the intensity of the output coupled EM radiation with a pyroelectric detector as a function of the separation between the input and output prism couplers. Radelin thermographic phosphor paper was also used for the direct visual observation of both the surface and EM modes. We present here further experimental data on the generation, propagation, and detection of surface polaritons at various metal-air interfaces and a more detailed theoretical discussion of their nature. In the absence of surface roughness, the attenuation of surface modes at a metal-air interface arises from electronic relaxation in the metal. In the case of metal-dielectric interfaces, the attenuation arises from losses in the surface active (metal) and surface inactive medium. Information about the real and imaginary parts of the dielectric constant can be obtained by combining measurements of the dispersion relation. (Author)

AD-A012 128/5GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park Dept of Physics
Virtual Excitation Type Surface Polaritons at the Interface of Semi-Infinite Anisotropic Media.
Technical rept.,
A. Hartstein, E. Burstein, J. J. Brion, and R. F. Wallis. 1972, 7p Rept no. TR-55
Availability: Pub. in Proceedings of Taormina Conference on Polaritons, p111-116.

Descriptors: *Quantum theory, *Surface waves, Quartz, Interfaces, Excitation, Dielectrics, Surface properties, Photons, Coupling(Interaction), Reprints.
Identifiers: *Polaritons, *Surface polaritons, Virtual states, Surface states, Excited states, Gyromagnetic media, Gyrodielectric media.

The nature of the surface polaritons that exist at the interface of two anisotropic media oriented such that the principal axes of the dielectric tensors are along the surface normal and the wave vector is discussed. Two different types of surface polaritons are found to occur depending on the components of the dielectric tensors. The first is a real excitation type surface polariton, similar to the surface polaritons that occur on isotropic media. The second is a virtual excitation type surface polariton. Virtual excitation surface polaritons are photons coupled to surface excitations, i.e., to excitations that do not occur in the absence of photon coupling. This type only occurs at small wave vectors. The virtual excitation type surface polaritons that exist on alpha-quartz, gyromagnetic media, and gyrodielectric media are discussed in detail. (Author)

AD-A012 136/8GA PC$3.25/MF$2.25
Washington State Univ Pullman Dept of Chemistry
Spectroscopic and Magnetic Evidence for Multiple-State Emission from Tris(2,2'-Bipyridine)Ruthenium (II) Sulfate,
D. C. Baker, and G. A. Crosby. 11 Mar 74, 7p
AFOSR-TR-75-0922
Grant AF-AFOSR-2207-72
Availability: Pub. in Chemical Physics, v4 n3 p428-433 1974.

Descriptors: *Pyridines, *Ruthenium compounds, *Sulfates, *Luminescence, *Complex compounds, Emission spectra, Transition metals, Excitation, Magnetic fields, Reprints.

Spectral changes of the charge-transfer photoluminescence of the title compound between 2 and 10 K have been interpreted in terms of a manifold of emitting states in thermal equilibrium. Analysis of the band shape changes by means of the Boltzmann law yields an energy gap of 10.2/cm in excellent agreement with the value obtained from published decay time measurements. A 75-kG magnetic field on the sample maintained at 1.65 K switches the emission back to that seen at 4.2 K. These results also corroborate the assignment of the lowest two states responsible for the luminescence to A sub 1 and E symmetry in the group D sub 3. (Author)

AD-A012 137/6GA PC$3.25/MF$2.25
Florida Univ Gainesville Dept of Chemistry
Niobium Oxide Molecule: ESR and Optical Spectra in Inert Matrices at 4 Degrees K; Establishment of Its Ground Electronic State as Quartet Sigma,
Joseph M. Brom, Jr., Clifton H. Durham, Jr., and William Weltner, Jr. 22 Feb 74, 14p AFOSR-TR-75-0921
Grant AF-AFOSR-2208-72
Availability: Pub. in Jnl. of Chemical Physics, v61 n3 p970-981, 1 Aug 74.

Descriptors: *Niobium compounds, *Oxides, *Electron spin resonance, Absorption spectra, Spectroscopy, Ground state, Cryogenics, Hyperfine structure, Interactions, Reprints.
Identifiers: *Niobium oxide.

AD-A012 181/4GA PC$3.25/MF$2.25
Air Force Cambridge Research Labs Hanscom AFB Mass
Derivation of the Dipole Approximation from the Exact Transition Probabilities for Hydrogen Atoms,
H. E. Moses. 27 Jan 75, 3p Rept no. AFCRL-TR-75-0348
Availability: Pub. in Physical Review A, v11 n6 p2196-2197 Jun 75.

Descriptors: *Transitions, *Probability, *Dipoles, *Hydrogen, Approximation, Equations, Atoms, Reprints.

The usual dipole approximation for the transition probabilities for hydrogen atoms is derived from the exact transition probabilities by considering j = 1 photons only, neglecting retardation, and using an identity derived from the wave equation for the radial wave function for the atom. (Author)

AD-A012 183/0GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia Dept of Physics
Surface Polaritons-Propagating Electromagnetic Modes at Interfaces.
Technical rept.,
E. Burstein, W. P. Chen, Y. J. Chen, and A. Hartstein. 17 Aug 74, 18p Rept no. TR-63
Availability: Pub. in Jnl. of Vacuum Science and Technology, v11 n6 p1004-1019 Nov/Dec 74.

Descriptors: *Quantum theory, *Wave propagation, *Surface waves, *Electromagnetic wave propagation, Interfaces, Dielectric properties, Magnetic properties, Dispersion relations, Anisotropy, Diffraction gratings, Reprints.
Identifiers: *Polaritons, *Surface polaritons, Bulk polaritons, Dielectric constant, Magnetic permeability, ATR(Attenuated total reflection), Attenuated total reflection, Adsorbed species.

Surface polaritons are interface electromagnetic modes whose propagation constants depend on the dielectric constants and magnetic permeabilities of the interfacing media. We discuss here (i) the nature of the modes which exist at single-interface and at slab (two-interface) configurations, (ii) the methods for coupling bulk polaritons and surface polaritons, and (iii) the use of surface polaritons as electromagnetic probes of surfaces and interfaces. (Author)

AD-A012 189/7GA PC$3.25/MF$2.25
Texas Univ At Austin Dept of Chemistry
Quantum Organic Chemistry,
Michael J. S. Dewar. 1975, 9p AFOSR-TR-75-0871
Grant AF-AFOSR-2749-75
Availability: Pub. in Science, v187 p1037-1044 Mar 75.

Descriptors: *Quantum chemistry, *Organic chemistry, *Organic compounds, Atomic orbitals, Molecular orbitals, Heat of activation, Heat of formation, Mathematical models, Energy levels, Reprints.
Identifiers: MINDO/3, Modified intermediate neglect of differential overlap.

This is a review for nonspecialists of the present situation concerning the use of quantum mechanical calculations as a practical chemical tool. The steps leading to the development of MINDO/3 are described and results obtained with it are summarized. MINDO/3 seems for the first time to provide chemists with an effective technique for finding out what really happens during chemical reactions and it can also provide all kinds of other information concerning chemical properties. (Author)

AD-A012 193/9GA PC$3.25/MF$2.25
IBM Thomas J Watson Research Center Yorktown Heights N Y
Selection-Rule Effects in Electron-Loss Spectroscopy of Ge and GaAs Surfaces,
R. Ludeke, and A. Koma. 30 Dec 74, 6p ARO-11574.12-P
Contract DAHC04-74-C-0012
Availability: Pub. in Physical Review Letters, v34 n13 p817-821, 31 Mar 75.

Descriptors: *Selection rules(Physics), *Electron spectroscopy, Single crystals, Low energy, Surface properties, Germanium, Gallium arsenides, Bonding, Reprints.
Identifiers: *Low energy electron loss spectroscopy, *Surface states, LEELS(Low energy electron loss spectroscopy), Dangling bonds.

Low-energy electron-loss spectroscopy on Ge and GaAs surfaces reveals opticlike selection-rule behavior for transitions involving d-core states and empty dangling-bond surface states. From the observed breakdown of these rules at low incident primary electron energies the symmetry of the dangling-bond states may be estimated. The Ga dangling bond is found to be largely s like on all surfaces, whereas the Ge dangling bond exhibits p-like character on the (111)-(8 x 8) surface, and mixed s-p character on the (100)-(2 x 2) surface. (Author)

AD-A012 254/9GA PC$3.25/MF$2.25
Connecticut Univ Storrs
Anharmonic Decay of Optical Phonon in Diamond,
P. G. Klemens. 2 Jan 75, 3p ARO-11717.4-P
Grant DAHC04-74-G-0068
Availability: Pub. in Physical Review B, v11 n8 p3206-3207, 15 Apr 75.

Descriptors: *Phonons, *Pair production, *Diamonds, Raman spectroscopy, Line spectra, Crystal lattices, Decay schemes, Semiconductors, Cryogenics, Reprints.
Identifiers: *Anharmonic decay, *Optical phonons, *Acoustical phonons, Line widths.

The width of the 1332 per cm first-order Raman line in diamond, measured from 15 to 970 K, varies with temperature as expected from the anharmonic interaction of the optical phonon with two phonons of half the frequency. The magnitude of the width agrees with a theoretical estimate.

AD-A012 255/6GA PC$3.25/MF$2.25
City Coll New York Dept of Physics
Radiation Reaction and Vacuum Fluctuations in Spontaneous Emission,
Peter W. Milonni, and Wallace Arden Smith. 25 Jul 74, 12p ARO-10611.15-P
Grant DA-ARO-D-31-124-73-G5
Availability: Pub. in Physical Review A, v11 n3 p814-824 Mar 75.

Descriptors: *Quantum electrodynamics, Quantum theory, Atoms, Electrons, Dipole moments, Energy transfer, Equations of motion, Radiation, Vacuum, Reprints.
Identifiers: Spontaneous emission.

A Heisenberg-picture treatment of spontaneous emission is given, and the origin of radiative line shifts and widths is discussed. It is shown that radiation reaction and vacuum fluctuations provide complementary conceptual bases for the interpretation of these radiative corrections. Alternative approaches are discussed, including the use of a random classical field to simulate the effects of the quantumelectrodynamical radiation field. (Author)

AD-A012 258/0GA PC$3.75/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Quantum Electrodynamics and Radiation Reaction: Nonrelativistic Atomic Frequency Shifts and Lifetimes,
J. R. Ackerhalt, and J. H. Eberly. 25 Mar 74, 28p ARO-8915.14-P
Contract DAHC04-75-C-0084
Availability: Pub. in Physical Review D, v10 n10 p3350-3375, 15 Nov 74.

Descriptors: *Quantum electrodynamics, *Frequency shift, *Electron transitions, Energy levels, Markov processes, Operators(Mathematics), Dipole moments, Approximation(Mathematics), Maxwells equations, Reprints.
Identifiers: *Nonrelativistic shifts, *Radiative lifetimes, Heisenberg operator, Line widths.

A quantum electrodynamic treatment of radiative corrections in atoms which is patterned after Lorentz's classical work on radiation damping is presented. Expressions for both radiative lifetimes and frequency shifts are calculated through second order in the electric charge for a fictitious two-level model atom and for a spinless one-electron atom with an infinite number of arbitrarily spaced energy levels. In order to apply the classical ideas of Lorentz to quantum-electrodyanmic problems of this kind we work directly with the relevant dynamical variables of the atom and field. The calculations are carried out entirely in the Heisenberg picture by recognizing the importance of radiation reaction. The quantized-field operator equations are integrated with the aid of a Markov approximation. The part of the integrated field that arises from the atomic electron current operator, the radiation-reaction field, is shown to be solely responsible for the atom's linewidths and frequency shifts. It is clear that it is unnecessary to invoke vacuum fluctuations at any stage. The usual quantum electrodynamic exponential decay law is found to govern the expectation values of the energy and dipole moment of the atom as well as the radiated-field amplitude. The theory nevertheless remains unitary. The Heisenberg operator commutation relations are shown to be valid at all times, and the Markov approximation is justified for times longer than a reciprocal transition frequency.

20K. Solid Mechanics

AD-A011 687/1GA PC$3.75/MF$2.25
Technion - Israel Inst of Tech Haifa Dept of Aeronautical Engineering
Buckling of Discretely Stringer-Stiffened Cylindrical Shells and Elastically Restrained Panels.
Scientific rept.,
Josef Singer, and Raphael Haftka. May 74, 39p Rept nos. TAE-91, Scientific-8 AFOSR-TR-75-0810
Contract AF-61(052)-905, Grant AF-AFOSR-2394-72

Descriptors: *Shells(Structural forms), *Stiffened cylinders, Panels, Loads(Forces), Buckling, Pressure, Instability, Cylindrical bodies.
Identifiers: *Cylindrical shells.

The buckling of eccentrically stringer-stiffened cylindrical shells is studied by a 'discrete' approach in which the stringers are considered as linear discontinuities represented by the Dirac delta function. Donnell type linear theory is used. Buckling loads under axial compression are calculated for local and general instability. Results for the latter are compared with those obtained by 'smeared'-stiffener theory. On account of the large number of stringers required to ensure failure by general instability and not by local buckling, the discreteness effect is usually very small. A parametric study is carried out for combinations of shell and stringer parameters chosen to emphasize the discreteness effect and the maximum effect found was 14%. The effect of rotational restraint, due to the torsional stiffness of the stringers on the buckling of panels is also studied.

AD-A011 713/5GA PC$4.25/MF$2.25
Massachusetts Inst of Tech Lexington Lincoln Lab
Applications of the Principle of Dynamic Equipollency to Mechanical Admittance Testing.
Technical note,
Ronald L. Bagley. 10 Mar 75, 56p Rept no. TN-1975-20 ESD-TR-75-134
Contract F19628-73-C-0002

Descriptors: *Mechanical impedance, *Structural mechanics, Beams(Structural), Degrees of freedom, Force(Mechanics), Admittance.
Identifiers: Dynamic equipollency.

The principle of dynamic equipollency is defined and applied to two areas of mechanical admittance/impedance testing: generation of experimental moment-rotational velocity admittances and impedances, and many-DOF (Degrees of Freedom) structures.

AD-A011 733/3GA PC$3.25/MF$2.25
Aeronautical Research Associates of Princeton Inc N J
A Formulation of the Global Equations of Motion of a Deformable Body.
Interim rept. 15 Jan 74-14 Jan 75,
Thomas B. McDonough. Mar 75, 24p Rept no. ARAP-240 AFOSR-TR-75-0815
Contract F44620-74-C-0045

Descriptors: *Deformation, *Structures, *Equations of motion, Integral equations, Stresses, Numerical integration.
Identifiers: Rigid bodies.

The global equations of motion for a deforming body are cast in a form which is attractive for many studies. The deforming body is assumed a continuum, but its constitutive behavior is left totally general. Equations treated represent the conservation of linear and angular momenta and kinetic energy. The motion - including deformation - of the body is of unrestricted magnitude. A translating and rotating reference frame is defined in terms of the linear and angular momenta of the body, and the global equations of motion are transformed in terms of parameters which are defined relative to this reference frame. It is defined so that the body possesses zero momenta as seen by an observer fixed in the reference frame. It is also shown that for a given motion, this choice of reference frame minimizes the kinetic energy of the body measured relative to the reference frame. The global equations are represented in a form similar to the classical rigid-body equations, which are shown to follow on the assumption of zero stretching. Finally, the condi-

tions for 'steady' motion are developed. Solutions are presented for steady motion and when the angular velocity has only steady direction.

AD-A011 895/0GA PC$3.25/MF$2.25
Army Materials and Mechanics Research Center Watertown Mass
Dynamic Stability of Axially-Stiffened Imperfect Cylindrical Shells under Axial Step Loading.
Chatta Lakshmikantham, and Tien-Yu Tsui. 7 Mar 73, 11p Rept no. AMMRC-TR-75-10
Availability: Pub. in AIAA Jnl., v12 n2 p163-169 Feb 74.

Descriptors: *Stiffened cylinders, *Shells(Structural forms), *Dynamic loads, Structural response, Buckling, Impulse loading, Equations of motion, Static stability, Reprints.
Identifiers: Dynamic stability.

The dynamic stability of an axially-stiffened cylinder under an axial impulsive load in the form of a step function is investigated. Donnell-Karman-type nonlinear equations are derived for the initially imperfect stiffened cylinders including eccentricity of stiffeners. A buckling criterion is defined and buckling loads are computed for different imperfection parameters and positive and negative eccentricities for a cylinder with an axial stiffening system. The results indicate the high imperfection sensitivity of axially-stiffened cylinders. (Author)

AD-A012 073/3GA Not available NTIS
Naval Research Lab Washington D C Shock and Vibration Information Center
The Shock and Vibration Digest. Volume 7 Number 6, June 1975.
Jun 75, 114p
See also Volume 7, Number 5, AD-A010 036.
Availability: Paper copy available from Shock and Vibration Center, Naval Research Lab., Code 8404, Washington, D.C. 20390. Annual subscription $40.00.

Descriptors: *Shock(Mechanics), *Vibration, *Periodicals, Machines, Rotation, Damping, Vibrational spectra, Vibration isolators, Shock spectra, Shock absorbers, Mechanical properties, Finite element analysis, Abstracts.

Contents: News briefs; Feature article--Some unstable whirl phenomena in rotating machinery; Abstracts from the current literature--Analysis and design, computer programs, environments, phenomenology, experimentation, components, systems; Author index; Literature review; Book reviews.

AD-A012 212/7GA PC$5.75/MF$2.25
Iowa Univ Iowa City Div of Materials Engineering
Optimal Design of Elastic Structures Under Dynamic Loads.
Technical rept. no. 18 (Final) Nov 73-Apr 75,
T. T. Feng, J. S. Arora, and E. J. Haug, Jr. May 75, 140p AC-CR-75-006
Grant DAHC04-74-G-0040

Descriptors: *Structural members, *Loads(Forces), *Stresses, Dynamic response, Elastic properties, Trusses, Steepest descent method, Matrices(Mathematics), Partial differential equations, Algorithms.
Identifiers: *Dynamic structural analysis, Eigenvalues.

In this report, optimal design of elastic structures under dynamic loads is considered. A general objective functional for the problem is defined, and a functional treatment of the transient dynamic response constraints (stress and displacement constraints) is presented. Constraints on the natural frequency of the structure and the design variables are also included. The general method developed for this class of problems is then applied to truss-frame structures.

AD-A012 320/8GA PC$3.75/MF$2.25
Pennsylvania Univ Philadelphia School of Metallurgy and Materials Science
Strain Localization in Cyclic Deformation of Copper Single Crystals,
J. M. Finney, and C. Laird. 19 Jul 74, 29p ARO-9329.5-MC
Grants DAHC04-74-G-0026, NSF-5-25-880
Availability: Pub. in Philosophical Magazine, v31 n2 p339-366 Feb 75.

Descriptors: *Plastic deformation, Strain(Mechanics), Single crystals, Copper, Saturation, Cyclic tests, Crystal defects, Dislocations, Reprints.
Identifiers: Slip bands, Strain localization, Cyclic deformation.

The localization of plastic strain into macroscopic groups of persistent slip bands has been determined on copper single crystals strain-cycled into saturation. Themacroscopic bands traverse the whole cross section and undergo complete reversibility of plastic strain with load reversibility. Although overall, surface slip steps form in proportion to the applied plastic strain, individual steps are not always completely reversed, leading to the rapid formation of a notch-peck topography within the bands. The dislocation structure of the persistent slip bands was determined, permitting a critical assessment of the various mechanisms proposed for saturation in low-strain cyclic deformation. Using existing ideas, an adequate model of saturation is based upon the cooperative movement of primary links between the persistent slip-band walls, but impeded in their motion by point-defect clusters and small dislocation debris. (Author)

N75-24033/3GA PC$4.25/MF$2.25
Royal Aircraft Establishment, Farnborough (England).
Residual Stresses in Notches Produced by Variable Operational Loads and Their Importance for the Application of the Linear Cumulative Damage Hypothesis.
D. Schutz. Mar 75, 75p RAE-LIB-TRANS-1800, BR47149

Descriptors: *Cumulative damage, *Load distribution (Forces), *Residual stress, *Stress concentration, Fatigue (Materials), Fatigue life, Numerical analysis, Stress-strain diagrams.

For abstract, see STAR 1315

N75-24037/4GA PC$4.25/MF$2.25
Structures Research Associates, Laguna Beach, Calif.
Computer Analysis of Multicircuit Shells of Revolution by the Field Method.
Final Report.
G. A. Cohen. Jun 75, 51p NASA-CR-2535
Contract NAS1-12764

Descriptors: *Bodies of revolution, *Circuits, *Computer programs, *Field theory (Algebra), Boundary value problems, Loads (Forces), Shells (Structural forms).

For abstract, see STAR 1315

N75-24422/8GA Not available NTIS
Centre de Recherches Scientifiques et Techniques de l'Industrie des Fabrications Metalliques, Brussels (Belgium). Section Construction Metallique.
A Finite Element Analysis of Bodies of Revolution. A Comparison Between Currently Used Types of Elements.
R. Beeckman, and D. Vanleeuwen. Dec 74, 56p CRIF-MT-102

Descriptors: *Bodies of revolution, *Finite element method, *Stiffness matrix, *Toroids, Degrees of freedom, Integral calculus, Nozzles, Rotors, Storage tanks, Surface geometry, Turbines.

For abstract, see STAR 1315

20L. Solid-State Physics

AD-A011 708/5GA PC$5.25/MF$2.25
Rockwell International Corp Thousand Oaks Calif Science Center
Investigations of Technical Problems in Gallium Arsenide.
Semi-annual technical rept. no. 3,
Fred H. Eisen, Bryant M. Welch, Cheng P. Wen, and Ricardo R. Zucca. 5 Feb 75, 106p Rept no. SC563.14SATR AFCRL-TR-75-0093
Contract F19628-74-C-0038, ARPA Order-2489
See also Semi-annual technical report no. 2, AD/A-003 704.

Descriptors: *Gallium arsenides, *Semiconductor diodes, *Microwave equipment, Impatt diodes, Mosfet semiconductors, Epitaxial growth, Semiconducting films, Crystal defects, Ion implantation, Surface properties, Impurities, Thin films, Annealing, Photoluminescence, Avalanche diodes, Computer applications, Electron transport, Reliability(Electronics).
Identifiers: Liquid phase epitaxy.

Various technological problems in the development of GaAs microwave devices are covered in this report. The work reported here includes: epitaxial growth of ultra-thin and high-resistivity films, study of the relationship between device performance and material parameters using IMPATT diodes, annealing study of n-n(+) interfaces to improve their electrical properties, growth of semi-insulating substrates and characterization techniques, and study of ion implantation as a tool for microwave device fabrication.

AD-A011 748/1GA PC$3.25/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Zinc Ion Implantation of Sulfur-Doped GaP.
Technical rept.,
Patrick M. Hemenger, and B. C. Dobbs. 2 Jul 73, 6p Rept no. AFML-TR-75-89
Availability: Pub. in Applied Physics Letters, v23 n8 p462-464, 15 Oct 73.

Descriptors: *Semiconductor doping, *Ion implantation, *Light emitting diodes, Zinc compounds, Gallium phosphides, Hall effect, Reprints.

AD-A011 749/9GA PC$3.25/MF$2.25
Air Force Materials Lab Wright-Patterson AFB Ohio
Measurement of High Resistivity Semiconductors using the van der Pauw Method.
Technical rept.,
Patrick M. Hemenger. 27 Nov 72, 6p Rept no. AFML-TR-75-88
Availability: Pub. in Review of Scientific Instruments, v44 n6 p698-700 Jun 73.

Descriptors: *Semiconductors, *Electrical resistivity, Measurement, Transport properties, Thinness, Layers, Zinc selenides, Reprints.
Identifiers: Van der Pauw method.

Apparatus is described that permits measurement of the electrical transport properties of semiconductors with resistance values over 10 to the 12th power ohms. The system utilizes a guarded approach to the van der Pauw method which simplifies sample geometry and contacting and permits evaluation of thin layers. The equipment is easy to operate, reliable, and constructed of readily available commercially purchased components. (Author)

AD-A011 779/6GA PC$3.75/MF$2.25
Manitoba Univ Winnipeg Dept of Physics
Magnetic Relaxation Effects in PrCo5 and Sm(x)Nd(1-x)Co5 Induced by Hydrogen and Deuterium.
Final rept. 3 Dec 73-30 Sep 74,
I. Maartense. Jan 75, 36p AFML-TR-74-277
Contract F33615-73-C-5060
See also report dated Oct 73, AD-775 717.

Descriptors: *Permanent magnets, *Cobalt alloys, Praseodymium compounds, Samarium compounds, Neodymium alloys, Intermetallic compounds, Magnetic properties, Impurities, Hydrogen, Deuterium, Single crystals, Canada.
Identifiers: Magnetic relaxation, *Cobalt intermetallics, *Praseodymium intermetallics, *Neodymium intermetallics, *Samarium intermetallics, Barkhausen effect, Magnetic permeability.

Measuremtns of the ac susceptibility of PrCo5 powder parallel to its c-axis show the existence of two relaxation processes which are present in samples exposed to hydrogen or deuterium but not in degassed samples. The two relaxations have time constants of 10 sec. at 165K and at 200K and are described by effective activation energies of 0.37 eV and 0.51 eV, respectively. Sm(x)Nd(1-x)Co(x) crystals treated with hydrogen show a magnetic relaxation equivalent to the higher energy process in PrCo5; between -20C and 50C, a strong Barkhausen effect dominates the magnetic behavior.

AD-A011 813/3GA PC$3.75/MF$2.25
Naval Research Lab Washington D C
The Relation of the Surface Properties of the Teflons to Frictional Electrification by Polystyrene.
Final rept. on Phase 1,
James B. Romans, and William A. Zisman. 6 Jun 75, 29p Rept no. NRL-7892

Descriptors: *Tetrafluoroethylene resins, *Friction, Polystyrene, Electrical properties, Annealing, Surface properties, Experimental design.
Identifiers: Electrification, *Triboelectric effect.

The friction and frictional electrification properties of Teflon TFE (polytetrafluoroethylene), Teflon PFA (tetrafluoroethylene-perfluoro-(alkyl vinyl ether) copolymer) and Teflon FEP (tetrafluoroethylene-hexafluoropropylene copolymer) have been studied by rubbing them against polystyrene. Potentials generated on the fluorocarbon polymers were measured by the classical Faraday ice-pail method. The relationship of surface energy and chemical constitution of the fluorocarbon surfaces to kinetic coefficient of friction and frictional electrification properties was investigated by using the contact-angle technique. The effects of annealing were also investigated Results are discussed, and mechanistic explanations are proposed.

AD-A011 877/8GA PC$3.75/MF$2.25
Gte Labs Inc Waltham Mass
Low Energy Ion-Electron Luminescence - A New Technique for the Excitation of Inorganic Phosphors.
Technical rept.,
Jerry Kramer. Dec 74, 40p Rept no. TR-1
Contract N00014-74-C-0315

Descriptors: *Phosphors, *Luminescence, *Ion bombardment, *Electron irradiation, Crystal lattices, Excitation, Holes(Electron deficiencies), Quantum efficiency.

A new technique for the excitation of inorganic phosphors by low kinetic energy ions (<40 eV) and low kinetic energy electrons (<20 eV) has been demonstrated and characterized. The characteristic light output of the phosphor has been used as a probe of the excitation mechanism. An empirical relationship between the light output and the ion and electron currents has been determined and used to ascertain the change in light output as a function of ion and electron kinetic energy and ionization potential. The excitation mechanism starts with the formation of holes by the ion beam. Although the holes are mobile in the lattice, some of the holes get trapped. In a second step electrons interact with these trapped holes to create an excited state(s) of the phosphor. Energy is transferred to the luminescent centers resulting in the characteristic emission of the phosphor. The slow or rate-limiting step in the production of light by low energy ions and electrons is the emission of light.

AD-A011 897/6GA PC$3.25/MF$2.25
Northwestern Univ Evanston Ill
Spin-Polarized Energy-Band Structure, Conduction-Electron Polarization, Spin Densities, and the Neutron Magnetic Form Factor of Ferromagnetic Gadolinium,
B. N. Harmon, and A. J. Freeman. 15 Apr 74, 17p
AFOSR-TR-75-0786
Grant AF-AFOSR-2012F-71
Availability: Pub. in Physical Review B, v10 n5 p1979-1993, 1 Sep 74.

Descriptors: *Band theory of solids, *Gadolinium, Ferromagnetic materials, Electrons, Conduction bands, Energy bands, Polarization, Neutrons, Plane waves, Augmentation, Fermi surfaces, Wave functions, Density, Reprints.
Identifiers: *Conduction electrons, Electron spin, Spin polarization, Spin density.

Conduction-electron polarization, spin densities, and neutron magnetic scattering in ferromagnetic Gd metal were studied using the spin-polarized augmented-plane-wave (APW) method in a warped-muffin-tin-potential formulation. The spin-up and spin-down bands were found to be very similar in shape to the bands from a paramagnetic calculation, with the exchange splitting proportional to the amount of d character in the bands. It was also found that the conduction-electron spin density determined from the APW wave functions is of mostly d character. This dominance of the d-like wave functions for the spin-dependent interactions is explained by (i) the much greater overlap of the 4f states with the d-like wave functions as compared to the s-p wave functions; (ii) the nearly complete d character of the bands in the region of the Fermi surface. The magnetic form factor was calculated from the conduction-electron spin density and compared with the recent neutron magnetic-form-factor measurement of Moon, Koehler, Cable, and Child. The calculated spin density was found to have the same shape as the 'diffuse' density derived by Moon et al. (including a negative but much smaller in magnitude spin density at the c site in the unit cell).

AD-A011 898/4GA PC$3.25/MF$2.25
Northwestern Univ Evanston Ill
Electronic Properties of PdTe2,
H. W. Myron. 4 Mar 74, 6p AFOSR-TR-75-0785
Grant AF-AFOSR-2012-71
Summary in French.
Availability: Pub. in Solid State Communications, v15 p395-398 1974.

Descriptors: *Palladium compounds, *Tellurides, *Electronics, *Solid State electronics, Eigenvectors, Electron density, Specific heat, Reprints.

The electronic structure of PdTe2 has been determined using the Korringa-Kohn-Rostoker method. Unlike the electronic structure of other metal dichalcogenides with the same crystal structure, the eigenfunctions of PdTe2 show strong metal and ligand mixing. The De Haasvan Alphen frequencies have been calculated and are in good agreement with experimental results. The calculated electronic density of states is in qualitative agreement with measurements of the specific heat of this material. (Author)

AD-A011 910/7GA PC$3.75/MF$2.25
California Univ Berkeley Dept of Chemical Engineering
Viscoelastic Properties of Homogeneous Triblock Copolymers of Styrene/alpha-Methyl Styrene and Their Polyblends with Homopolymers.
Technical rept.,
David R. Hansen, and Mitchel Shen. 1 Jul 75,
38p Rept no. TR-2
Contract N00014-75-C-0955

Descriptors: *Viscoelasticity, *Styrene plastics, *Block copolymers, Stress relaxation, Phase transformations, Glass, Homogeneity.

Seven triblock copolymers of styrene/alpha-methyl styrene were prepared via anionic polymerization. Two types of block structures, ASA and SAS, were made. By the use of Time Temperature Superposition Principle, stress relaxation isotherms of these block copolymers were readily shifted into smooth viscoelastic master curves. The shift factor data of all the block copolymers follow the classical WLF equation. Loss tangent data obtained by dynamic mechanical measurements show only one glass transition in each of these block copolymers, thus indicating the homogeneous nature of these materials. From the master curves, maximum relaxation times were determined by Procedure X method of Tobolsky and Murakami. These maximum relaxation times were found to vary as a function of copolymer composition and block structure.

AD-A011 959/4GA PC$3.25/MF$2.25
California Univ Berkeley
Integrated Grating-Type Schottky-Barrier Photodetector with Optical Channel Waveguide,
Cheng-Chung Tseng, and Shyh Wang. 22 Jan 75, 5p ARO-11833.11-EI
Contract N00014-69-A-0200-1063, Grant DAHC04-71-G-0070
Availability: Pub. in Applied Physics Letters, v26 n11 p632-635, 1 Jun 75.

Descriptors: *Schottky barrier devices, *Diffraction gratings, *Photodetectors, Integrated circuits, Prisms(Optics), Channels, Silicon, Waveguides, Gratings(Spectra), Couplers, Reprints.
Identifiers: *Optical channel waveguides.

A grating-type Schottky-barrier photodetector has been incorporated within an optical channel waveguide. Silicon is used as the base material for future integration of optical and electronic components. The fabrication processes are simple and completely compatible with the standard silicon planar technology. Estimated responsivity of the detector is 0.33 microamps per microwatt at a wavelength of 0.6328 micrometers with nanosecond response time. (Author)

AD-A011 984/2GA PC$3.75/MF$2.25
University of Southern California Los Angeles Electronic Sciences Lab
High Temperature Defect Chemistry of Aluminum Oxide.
Final technical rept. 6 Sep 71-5 Sep 74,
F. A. Kroger. Apr 75, 46p ARL-75-0108
Contract F33615-72-C-1123
See also report dated 1974, N74-29970.

Descriptors: *Alumina, *Crystal defects, Electrical properties, Optical properties, Absorption(Physical), Electron paramagnetic

resonance, Cobalt, Iron, Doping, Thermodynamics, Energy levels, Oxidation, Reduction(Chemistry), Single crystals, Mathematical models.
Identifiers: *Aluminum oxide.

The high temperature defect structure of aluminum oxide was investigated by measurements on single crystals containing known amounts of cobalt. These include high temperature measurements of the conductivity and the emf of concentration cells as functions of oxygen pressure and temperature, and low temperature measurements of optical absorption and electron spin resonance. Analysis of the results leads to a defect model dominated by interstitial aluminum and divalent substitutional cobalt, to parameters of thermodynamic constants regulating the formation of point defects and the oxidation-reduction of cobalt from divalent to trivalent and vice versa, and to the position of levels of cobalt in the forbidden gap. A similar model applies to aluminum oxides doped with iron.

AD-A011 996/6GA PC$3.75/MF$2.25
Case Western Reserve Univ Cleveland Ohio
Electronic Excitation Processes in Semiconductors.
Final rept. 1 Jun 71-31 May 74,
Benjamin Segall, and Emmanuel dela Hostria.
May 75, 35p ARL-75-0111
Contract F33615-71-C-1789

Descriptors: *Semiconductors, *Excitons, Optical properties, Absorption(Physical), Band theory of solids, Laser beams, Phonons, Cadmium sulfides, Zinc sulfides, Hamiltonian, Valence, Phonons, Electrons, Holes(Electron deficiencies).
Identifiers: Wurtzite lattices, Zincblende lattices.

The purpose of this work is to determine the mechanisms responsible for the 'fast' component of the 'induced' absroption observed by Goto and Langer in CdS crystals subjected to high intensity optical excitation. From qualitative features of the reported absorption spectra it is concluded that the relevant process (or processes) intimately involves excitons. These absorption processes are described (approximately) by a two-step mechanism in which the first step consists of the simultaneous annihilation of the photon and the creation of a virtual state in an exciton band. In the second step, the exciton is scattered into its final state. Three scattering agents are considered, namely, longitudinal optical phonons, electrons and holes, and excitons. For the purpose of interpreting the empirical data on the exciton spectra in wurtzite semiconductors, the appropriate effective Hamiltonian for the excitons is set up. Relations between the valence band parameters for a wurtzite crystal and the corresponding zinc blende crystal are established.

AD-A012 021/2GA PC$4.75/MF$2.25
Texas Univ At Austin Electronics Research Center
Electron-Nonhomogeneous Magnetization Interaction in Thin Films of Cadmium Chromium Selenide.
Technical rept.,
Athanasios J. Syllaios, and Dimiter I. Tchernev.
15 Aug 74, 84p Rept no. TR-162 AFOSR-TR-75-0866

Descriptors: *Semiconducting films, *Magnetization, Ferromagnetic materials, Equations of motion, Thin films, Sputtering, Electron transport, Magnetic properties, Electrical properties, Chromium compounds, Cadmium compounds, Selenides.
Identifiers: *Cadmium chromium selenides, *Ferromagnetic semiconductors, Electron spin.

The equations of motion for the electron spin and trajectory are solved in an inhomogeneous magnetic field, such as a magnetic domain wall or a periodic magnetic structure in a ferromagnetic semiconductor. It is found that the electron spin polarization is conserved only for electrons traveling through a magnetization reversal in a time shorter than the Larmor precession period of the spin around the magnetization vector. There are two different kinds of trajectories. For electron velocities and electric fields smaller than a critical value, the trajectory is cycloidal. When the critical value is exceeded the trajectory is modified drastically. It is concluded that these effects will be best observed in thin films of n-type CdCr2Se4, a high mobility ferromagnetic semiconductor. Thin CdCr2Se4 films were prepared by RF sputtering of stoichiometric mixtures of CdSe + Cr2Se3 and subsequent annealing in Se atmosphere at elevated temperatures. Their electrical and magnetic properties are studied and discussed in view of the above calculations.

AD-A012 096/4GA PC$6.25/MF$2.25
Pennsylvania State Univ University Park Materials Research Lab
Piezoelectric Materials with Positive Elastic Constant Temperature Coefficients.
Final rept. 8 Jan 73-8 Jan 75,
G. R. Barsch, and R. E. Newnham. Apr 75, 166p
AFCRL-TR-75-0163
Contract F19628-73-C-0108, Grant NSF-GH-34547

Descriptors: *Piezoelectric materials, *Acoustooptics, *Elastic properties, Heuristic methods, Temperature coefficients, Quartz, Lead compounds, Bismuth compounds, Crystal structure, Aluminum compounds, Phosphates, Silicates, Ultrasonic properties, Germanates, Sodium compounds, Crystal growth, Surface waves, Acoustic waves.
Identifiers: Temperature compensation, *Acoustic surface waves, Lead germanates, Bismuth silicates, Lithium aluminosilicates, Sodium aluminosilicates, Aluminum phosphates, Lithium aluminosilicates, Potassium aluminosilicates, Ultrasonic attenuation.

In order to search for new temperature compensated materials for surface acoustic wave (SAW)devices with low ultrasonic attenuation ahd high electromechanical coupling, the following theoretical and experimental investigations were carried out: Lattice dynamics of alpha-quartz; Heuristic molecular engineering approach--temperature coefficients of elastic constants, electromechanical coupling factor, ultrasonic attenuation, list of new potentially temperature compensated materials; Crystal growth; Elastic and thermoelastic property measurements--lead germanate, nepheline, berlinite, eulytite, and NaAlSiO4.

AD-A012 124/4GA PC$3.25/MF$2.25
Pennsylvania Univ Philadelphia Dept of Physics
Electric Field Modulated Raman Scattering in CdS.
Technical rept.,
M. L. Shand, and E. Burstein. 1973, 10p Rept no. TR-65
Availability: Pub. in Surface Science, 37 p143-152 1973.

Descriptors: *Cadmium sulfides, *Raman spectra, Electric fields, Scattering, Phonons, Optical phenomena, Vector analysis, Reprints.
Identifiers: Franz keldysh mechanism.

Electric field modulated Raman scattering by A1LO phonons in CdS were observed. The field induced scattering is observed with a geometry in which Raman scattering by A1LO Phonons is normally allowed. The interference of the field induced and allowed terms in the transition susceptibility leads to a modulated Raman scattering intensity proportional to the applied field. This is contrasted with data previously reported on field induced Raman scattering by E1 LO phonons in a configuration in which the Raman scattering is normally forbidden and in which there is no interference between linear wavevector dependent and field induced terms in the transition susceptibility. Electric field effects on Raman scattering by TO phonons and by 2 LO phonons is also discussed. (Author)

AD-A012 127/7GA PC$3.25/MF$2.25
Pennsylvania State Univ University Park Dept of Physics
Phase-Matched Electromagnetic Generation and Detection of Surface Elastic Waves on Nonconducting Solids.
Technical rept.,
H. Talaat, and E. Burstein. 18 Feb 74, 5p Rept no. TR-59
Availability: Pub. in Jnl. of Applied Physics, v45 n10 p4360-4362 Oct 74.

Descriptors: *Surface waves, *Electromagnetic wave propagation, *Lorentz force, Elastic waves, Magnetic fields, Directional, High frequency, Silicon, Resistance, Aluminum, Phase, Matching, Vibration, Voltage, Detection, Reprints.
Identifiers: Meander lines, Electric potential.

Surface elastic waves have been generated and detected at a fundamental frequency of 15.5 MHz on high-resistivity silicon. The generation process involved the Lorentz forces exerted by a static magnetic field on the current-carrying elements of an evaporated aluminum meander line whose spatial periodicity matched that of the surface waves. The detection process involved the motional emf induced by the magnetic field in the vibrating elements of the receiver meander line. The generation-detection signal amplitude shows a B squared dependence and is a maximum when the magnetic field is parallel to the direction of propagation.

AD-A012 177/2GA PC$4.25/MF$2.25
Army Missile Research Development and Engineering Lab Redstone Arsenal Ala Guidance and Control Directorate
Dielectric Breakdown in Solids.
Technical rept.,
Paul P. Budenstein. 20 Dec 74, 54p Rept no. RG-75-25

Descriptors: *Breakdown(Electronic threshold), Luminescence, Crack propagation, Solids, Chain reactions, Chemical bonds, Cracking(Fracturing), Electrical conductivity, Dielectric properties.
Identifiers: *Dielectric breakdown.

Experimental and theoretical descriptions of dielectric breakdown phenomena in solids are reviewed. No existing theory seems to adequately explain the range of observed effects. A 'new' model of dielectric breakdown is proposed that combines existing mechanisms in a distinctive fashion. The model considers the breakdown process to contain five stages: creation of a critical charge density, bond disruption, chemical chain reaction, growth of a gaseous cavity and crack formation, completion of the gaseous channel bridging the electrodes and conduction through this channel. Breakdown conduction is taken to occur only after the solid has been bridged by the gaseous channel. A phenomenological theory is presented for the growth dynamics of the channel. The implications of the entire model are discussed. The model is believed to provide meaningful perspectives concerning the light emission accompanying breakdown, on the geometric configuration of breakdown patterns, on the roles of inhomogeneities, voids and electrode projections, and other significant aspects of breakdown.

AD-A012 191/3GA PC$3.25/MF$2.25
Washington Univ Seattle Dept of Physics
Optical Constants of Some Silver Alloys,
C. J. Flaten, and E. A. Stern. 21 Aug 74, 15p
AFOSR-TR-75-0692
Grant AF-AFOSR-2779-75
Availability: Pub. in Physical Review B, v11 n2 p638-650, 15 Jan 75.

Descriptors: *Silver alloys, *Cadmium alloys, *Magnesium alloys, *Tin alloys, *Optics, Optical properties, Constants, Electronics, Reprints.
Identifiers: Plasma frequency.

The optical constants between 1.40 and 5.25 eV of three disordered alloy systems, AgCd, AgMg, and AgSn, have been directly measured over their respective alpha-phase ranges. The measurements indicate that the onset of the L2' - L1 transitions in pure Ag occurs at 3.33 + or - 0.08 eV. The measurements clearly show the delineation of the alloys into two classes, one called class A, where the formalism of periodic structures with direct optical transitions is applicable, and one called class B, where this formalism is not applicable, and indirect optical transitions dominate in the changes caused by alloying. The plasma frequency in the Drude region is found to be a constant for these alloys within experimental error. For both of the class-A alloys, AgMg and AgCd, the electronic structure is very similar and a non-rigid-band variation of energy levels is found which can be qualitatively understood in terms of alloy theory. AgSn is a class-B alloy, the understanding of which is more difficult. (Author)

AD-A012 208/5GA PC$3.25/MF$2.25
Rochester Univ N Y Dept of Physics and Astronomy
Energy Transfer and Picosecond Relaxation Processes in Condensed Systems.
Final rept. 1 Jun 71-30 Jun 74,
D. L. Dexter. May 75, 13p ARL-75-0114
Contract F33615-71-C-1820

Descriptors: *Excitons, *Photoionization, *Energy transfer, Optical properties, Solids, Scientific research, Magnetic properties, Photons, Luminescence, Solidified gases, Nitrogen.
Identifiers: *Librons.

This report contains a brief summary of research performed on optical and mechanical properties of solids, including energy transfer and photo-ionization. The topics discussed include core (X-ray) excitons, effects of magnetic fields on excitons in many-valley semiconductors, simultaneous and cooperative absorption of a photon and energy transfer, effects to be expected because of non-infinite vibrational relaxation rates, a new method for generating sum-rules, and some remarkable products thereof, the angular distribution of electrons in the photo-ionization of polyatomic molecules, and librons in solid N2.

AD-A012 231/7GA PC$3.25/MF$2.25
Idaho Univ Moscow Dept of Physics
The Study of Molecules and Crystals by Light-Scattering Spectroscopy.
Final rept.
May 75, 5p
Contract N00014-72-A-0232-0001

Descriptors: *Light scattering, *Crystals, Phonons, Scientific research, Dye lasers, Tunable lasers, Crystal lattices, Molecular spectroscopy.
Identifiers: Barium titanates, *Polaritons, Line broadening.

This final report summarizes all work accomplished under the contract entitled 'The Study of Molecules and Crystals by Light-Scattering Spectroscopy.' The authors measured the light-scattering line shape of the soft E polariton mode (the 'ferroelectric mode') in tetragonal BaTiO3 as a function of the magnitude of the momentum of the polaritons. Other polariton studies were also done.

AD-A012 262/2GA PC$3.25/MF$2.25
Stanford Univ Calif
Group-IIa Impurities in Glassy As2Se3,
K. S. Liang, and A. Bienenstock. 23 Oct 74, 5p
ARO-9240.25-P
Contract DAHC04-70-C-0044, Grant DA-ARO-D-31-124-72-G151
Availability: Pub. in Jnl. of Non-Crystalline Solids, 17 p289-292 1975.

Descriptors: *Amorphous materials, *Semiconductors, *Electrical conductivity, Arsenic compounds, Selenides, Covalence, Doping, Magnesium, Glass, Beryllium, Impurities, Calcium, Concentration(Chemistry), Reprints.
Identifiers: *Amorphous semiconductors, *Arsenic selenide, Group 2 elements.

Structural studies were undertaken to determine the effects of impurities on the conductivity of glassy As2Se3. (Author)

AD-A012 274/7GA PC$5.25/MF$2.25
Temple Univ Philadelphia Pa Dept of Chemistry
A Study of the Mechanism of Pyroelectricity in Polymer Films.
Final rept.,
B. Oh, A. I. Baise, R. E. Salomon, and M. M. Labes. Jan 75, 115p
Contract DAAK02-74-C-0113

Descriptors: *Pyroelectricity, *Polymeric films, Polarization, Fluoropolymers, Polyvinylidenes, Models, Tetrafluoroethylene resins.
Identifiers: *Polyvinylidene fluorides, Copolymers.

A study was undertaken of both theoretical and experimental aspects of the phenomenon of pyroelectricity in polymer films, focussing on polyvinylidene fluoride. Four theoretical models were considered in detail: a 'rigid rod' model; a 'perimeter of separation' model; a 'molecular rearrangement' model; and a 'space charge' model. Experimental studies developed some methods which may be useful in obtaining mechanistic information, and also determined that a copolymer of vinylidene fluoride and tetrafluoroethylene had a significantly larger pyroelectric coefficient than polyvinylidene fluoride homopolymer.

AD-A012 362/0GA PC$3.75/MF$2.25
Illinois Univ At Urbana-Champaign Materials Research Lab
Comments on the X-ray Edge and Recoil Problems,
C. P. Flynn. Jun 75, 31p
Contract N00014-67-A-0305-0027, Grant NSF-DMR72-03026

Descriptors: *Excitation, *Metals, Electron transitions, Band theory of solids, Recoil, Electron density, Absorption, Photons.
Identifiers: Electron electron interactions.

Some particular cases of the x-ray edge and recoil problems are examined. The usual independent-particle theory is evaluated exactly for the case in which the excitation introduces a full virtual level into the conduction band. These results make contact with studies of rare gas pair absorption in metals and also afford a comparison with earlier theories. Several aspects of the difficulties introduced by the electron-electron interactions in real metals are also discussed.

N75-23750/3GA PC$4.25/MF$2.25
Technische Universitaet, Munich (West Germany).
Anomalous Hall Effect in Metals with Small Concentrations of Localized Magnetic Defects Anomaler Hall-Effekt in Metallen MIT Kleinen Konzentrationen Lokalisierter Magnetischer Fehlstellen.
Ph.D. Thesis.
H. J. Schirlitzki. 1974, 73p
Language in German.

Descriptors: *Hall effect, *Magnetic anomalies, *Metals, Alloys, Electron spin, Magnetic fields, Spin dynamics, Spin-spin coupling.

For abstract, see STAR 1315

N75-23787/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Investigation of the Galvanomagnetic Properties of Graphite in Magnetic Fields Up to 500 Koe at Low Temperatures.
N. B. Brandt, G. A. Kapustin, V. G. Karavayev, A. S. Kotosonov, and Y. A. Svistova. Jun 75, 19p
NASA-TT-F-16387
Contract NASW-2481
Tran-Transl. Into English from Zh. Eksperim. I Teor. Fiz. (Ussr), V. 67, No. 3(9), 1974 p 1136-1147.

Descriptors: *Electrical resistance, *Galvanomagnetic effects, *Graphite, *Hall effect, *Magnetic fields, Carrier mobility, Electron density (Concentration), Fermi surfaces, Holes (Electron deficiencies), Magnetoresistivity, Numerical analysis.

For abstract, see STAR 1315

N75-24432/7GA Not available NTIS
Joint Inst. for Nuclear Research, Dubna (USSR). Lab. of Theoretical Physics.
Low Temperature Magnetization for Heisenberg Ferromagnet.
N. M. Plakida, and P. R. Rusek. 1974, 11p JINR-P4-8032
Language in Russian.

Descriptors: *Ferromagnetism, *Low temperature, *Magnetization, Green function, Theoretical physics.

For abstract, see STAR 1315

N75-24503/5GA PC$3.25/MF$2.25
Cornell Univ., Ithaca, N.Y. Lab. of Atomic and Solid State Physics.
Four Particle Exchange in Solid He-3.
A. K. Mcmahan. 1975, 10p NASA-CR-142801, INDEX-67.80-JD
Contracts NGR-33-010-188, DMR74-23494

Descriptors: *Helium atoms, *Particle interactions, Analysis (Mathematics), Body centered cubic lattices, Hamiltonian functions, Particle spin, Phase transformations, Solid state, Spin exchange, Transition temperature.

For abstract, see STAR 1315

N75-24504/3GA PC$3.75/MF$2.25
Lincoln Lab., Mass. Inst. of Tech., Lexington.
Research for Preparation of Cation-Conducting Solids by High-Pressure Synthesis and Other Methods.
Final Report, 1 Aug. 1973 - 28 Feb. 1975.
J. B. Goodenough, H. Y. P. Hong, J. A. Kafalas, and K. Dwight, Jr.. 31 Mar 75, 30p NASA-CR-134836, 43205-C/FR/75
NASA ORDER C-43205-C

Descriptors: *Cations, *Electrical resistivity, *High pressure, *Ion exchange membrane electrolytes, Activation energy, Body centered cubic lattices, Sodium, Storage batteries.

For abstract, see STAR 1315

TT-74-58083 PC$5.75/MF$2.25
National Science Foundation, Washington, D.C. Office of Intergovernmental Science and Research Utilization.
Physics and Technology of Semiconducting Materials and Converters (Fizika i Tekhnologiya Poloprovodnikovekh Materialov i Preobrazovatelei).
1975, 139p
Trans. of mono. Doklady Vsesoyuznoi Konferentsii po Ispolvzovaniyu Solnetsnoi Energii, Erevan, 17-21 Jun 1969, Moscow, 1969, Seksiya C-1. (Reports of All-Union Conference on the Utilization of Solar Energy, Erevan, 17-21 June 1969), Sect. S-1. Sponsored in part by National Science Foundation, Washington, D.C. Special Foreign Currency Science Information Program.

Descriptors: *Semiconductors, *Photovoltaic cells, *Solar cells, Thermoelectricity, Cadmium sulfides, Cadmium tellurides, Indium phosphides, Gallium arsenides, Silicon, Germanium, Meetings, Translations, USSR.
Identifiers: Photovoltaic cells, Thermophotovoltaic generators.

Topics such as the following are discussed: CdS, CdSe, CdTe, solar photoelectric cells; silicon and germanium recombination processes; photoelements; p-n transitions of InP, GaP, and CdTe; gallium arsenides; thermoelectric materials.

20M. Thermodynamics

AD-A012 016/2GA PC$3.75/MF$2.25
Oregon Univ Eugene Dept of Physics
The Ghost of a Vanished Vortex Ring,
Russell J. /Donnelly
Nov 74, 46p AFOSR-TR-75-0787
Grants AF-AFOSR-1999-71, NSF-GH-35898
Pub. in Quantum Statistical Mechanics in the Natural Sciences, p359-402 n.d.

Descriptors: *Liquid helium, *Superfluidity, Vortices.
Identifiers: *Rotons, Roton roton interactions.

Onsager's suggestion that a roton is a vortex ring of molecular size is discussed, and a review of experimental evidence together with theories based on this idea are presented.

AD-A012 022/0GA PC$3.25/MF$2.25
Biot (Maurice A) Brussels (Belgium)
Variational Thermodynamics of Viscous Compressible Heat Conducting Fluids,
M. A. Biot. May 75, 15p AFOSR-TR-75-0911
Contract F44620-71-C-0092

Descriptors: *Fluids, *Thermodynamics, *Compressible flow, Viscosity, Entropy, Heat transfer, Fluid dynamics, Calculus of variations.

A new variational principle of virtual dissipation generalizing d'Alembert's principle to nonlinear irreversible thermodynamics is applied to compressible heat conducting fluids with Newtonian and non-Newtonian viscosity. The principle is applied in the context of Eulerian formalism where the flow is described with reference to a fixed coordinate system. New concepts of entropy displacement and mass displacement are used as well as a new definition of the chemical potential which avoids the usual ambiguities of the classical thermodynamic approach. The variational principle is used to derive a novel form of field differential equations for the coupled fluid dynamics and convective heat transfer.

AD-A012 317/4GA PC$3.25/MF$2.25
Army Foreign Science and Technology Center Charlottesville Va
Thermal Conductivity of Bismuth Telluride in Solid and Liquid States,
E. V. Shadrichev, and I. A. Smirnov. 17 Dec 74, 8p Rept no. FSTC-HT-23-0205-75
Trans. of mono. Materials of the All-Union Thermo-physical Conference on Material Properties at High Temperatures (3rd). Teplofizichekie Svoistua Tverkykh Tel, at Kiev, 1971.

Descriptors: *Thermal conductivity, Semiconductors, Tellurides, Thermoelectricity, Temperature, Measuring instruments, Instrumentation, Translations, USSR, Bismuth compounds.
Identifiers: *Bismuth tellurides.

Studies of solid Bi2Te3 thermal conductivity at high temperatures, particularly above its melting point, remain practically incomplete. The experimental device described herein features melt qualities, unobtainable with other equipment, and yielding greater accuracy and reliability when measuring solid or liquid state thermal conductivity alone or in conjunction with thermo-emf over a wide temperature range.

N75-23891/5GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Fluidized Bed Regenerators for Brayton Cycles.
L. D. Nichols. 1975, 11p NASA-TM-X-71736, E-8364
Conf-Proposed for Presentation at Intersoc. Energy Conversion Eng. Conf., Newark, Del., 17-22 Aug. 1975.

Descriptors: *Brayton cycle, *Fluidized bed processors, *Regenerators, Ceramics, High temperature, Thermodynamic efficiency.

For abstract, see STAR 1315

20N. Wave Propagation

AD-A011 937/0GA PC$6.25/MF$2.25
Dikewood Corp Albuquerque N Mex
Spherical Cavity Resonant Damping through the Use of an Impedance Loaded Shell Inside the Chamber.
Final rept. 28 Sep 73-31 Mar 74,
Terry L. Brown. Jun 75, 173p AFWL-TR-74-255
Contract F29601-74-C-0010

Descriptors: *Cavities, *Electromagnetic pulse simulators, Resonant frequency, Spheres, Damping, Electromagnetic fields, Loading(Electronics), Impedance, Frequency shift, Numerical analysis.

This report addresses itself to one aspect of a simulator concept for simulating EMP in exoatmospheric regions by the incorporation of a spherical vacuum test chamber. Many important features affect the electromagnetic interactions of a space system with this type of spherical cavity. One of these is the problem of resonance. The report presents a complete parameter study of the resonant frequencies of a perfectly conducting spherical chamber with an inner spherically shaped impedance loaded damping structure. Frequency shifts are given for a wide range of damper location and loading. The resulting cavity damping is given for several lower order E and H modes.

AD-A012 036/0GA PC$3.25/MF$2.25
New York Univ N Y Courant Inst of Mathematical Sciences
Multi-Mode Surface Wave Phenomena,
Samuel N. Karp , and Richard C. Morgan. 1975, 14p Rept no. EL-41
Contract N00014-67-A-0467-0015
Abstract in French, German and Italian.
Availability: Pub. in International Jnl. of Engineering Science, v13 p687-698 1975.

Descriptors: *Surface waves, *Wave propagation, Multimode, Modes, Short circuits, Junctions, Boundary value problems, power, Reprints.

This paper illustrates, by means of an explicitly solvable problem, use of a slightly singular solution to demonstrate certain aspects of surface wave propagation. The solution is required to be bounded. However, one of the first derivatives is allowed to be singular at a junction of the structure. The surface wave guidance action of the structure is modelled by a two-mode phenomenological boundary condition (Multiple impedance condition). For simplicity of illustration, a plane structure that is terminated by a perfectly conducting plane vertical to it, is selected. The solution to the resulting mathematically formulated two-dimensional quarter plane problem is obtained exactly in an elementary fashion. Thus, it is possible to simply observe certain properties of surface wave propagation. The main result is that the sub-surface power flow at the junction depends directly on the amplitude of the slightly singular solution, leading to the conjecture that such fields represent leakage or excitation through the junction. Additionally, we show that control over the form of the excited outward travelling surface waves may be exercised by inclusion of this term or by a slot imbedded in the vertical termination, i.e., mode conversion is possible. Finally, by simulataneously adjusting the termination and the slot, the structure can be made to be only cylindrically radiating. The multiple impedance structure is extended in a virtual manner so that the effect of its internal field may be taken into account when computing the total power flow in the surface wave field. In particular, modal surface wave power flow is determined by associating an interior field with each component of the exterior surface wave field.

AD-A012 167/3GA PC$3.75/MF$2.25
Army Electronics Command Fort Monmouth N J
Rain-Attenuation and Side-Scatter Measurements of Millimeter Waves over Short Paths.
Final rept. Jan 73-Dec 74,
James W. Mink. Jun 75, 28p Rept no. ECOM-4327

Descriptors: *Millimeter waves, *Electromagnetic scattering, Rain, Radio transmission, Measurement, Test methods, Atmospheric scattering, Attenuation.
Identifiers: *Atmospheric attenuation.

Results of rain-attenuation and side-scatter measurements at millimeter waves are presented that have been obtained with a shuttle-pulse technique. This technique requires a path length through rain of only a few meters, so that rainfall rate and drop-size distribution can be considered uniform along this path.

AD-A012 168/1GA PC$3.25/MF$2.25
Army Electronics Command Fort Monmouth N J
A Digital Polarimeter for Measuring the Faraday Rotation Using a Beacon from a Geostationary Satellite.
Final rept.,
F. J. Gorman, Jr. Jun 75, 25p Rept no. ECOM-4330

Descriptors: *Ionospheric propagation, *Faraday effect, *Polarimeters, Space to surface, Digital systems, Electron density, Radio beacons, Polarization, Radiation, Phase locked systems, Receivers, Computer programs.

The digital polarimeter described was designed to measure continuously and record automatically the rotation angle of a linearly polarized wave. The polarization rotation is caused by a phenomena known as the Faraday effect. The

digital polarimeter uses a dual phase-lock-loop receiver which directly measures the phase difference between the right- and left-hand circular components of the received linearly polarized signal. This approach provides the optimum in sensitivity and dynamic range. A digital multicycle phase meter measures the phase difference between amplified and down converted circular components. The measured phase is then formatted and recorded on a digital magnetic tape recorder for automatic computer analysis.

AD-A012 178/0GA PC$3.75/MF$2.25
Harry Diamond Labs Adelphi Md
Contributions to the Theory of Wave Propagation on Long Wires Above Ground.
Technical rept.,
Leo C. Levitt, and Egon Marx. Dec 74, 40p Rept no. HDL-TR-1693

Descriptors: *Electromagnetic wave propagation, Wire, Wave equations, Green's function, Transmission lines.
Identifiers: Helmholtz equation.

The problem of an infinite wire above a plane infinite ground has been investigated, with a view toward studying the types of waves that this structure can support with no incident radiation. It was found that, although a propagation constant can be meaningfully defined, the concepts of impedance and admittance per unit length cannot be simply generalized from transmission-line theory. The difficulty associated with the solutions of the two-dimensional Helmholtz equation is discussed, and the outgoing waves that increase in amplitude exponentially with the distance from the source are reasonably interpreted.

AD-A012 256/4GA PC$3.25/MF$2.25
Institute for Telecommunication Sciences Boulder Colo
Molecular Transfer Characteristics of Air between 40 and 140 GHz,
Hans J. Liebe. 20 Feb 74, 10p ARO-12233.1-GS
Availability: Pub. in IEEE Transactions on Microwave Theory and Techniques, vMTT-23 n4 p380-386 Apr 75.

Descriptors: *Radio transmission, Extremely high frequency, Radio waves, Propagation, Molecular properties, Air, Atmospheres, Microwave spectroscopy, Oxygen, Water vapor, Reprints.

Radio wave propagation in the 40-140-GHz band through the first hundred kilometers of the clear atmosphere is strongly influenced by many (>30) lines of the oxygen microwave spectrum (O2-MS) and to a lesser extent by water vapor. A unified treatment of molecular attenuation and phase dispersion is formulated whereby results of molecular physics are translated into frequency-, temperature-, and pressure-dependencies.

AD-A012 257/2GA PC$3.25/MF$2.25
Polytechnic Inst of Brooklyn N Y Dept of Electrical Engineering and Electrophysics
Complex Space - Time Rays and Their Application to Pulse Propagation in Lossy Dispersive Media,
Kenneth A. Connor, and Leopold B. Felsen. 28 Jan 74, 15p ARO-8155.12-EL
Contracts DAHC04-69-C-0079, F44620-69-C-0047
Availability: Pub. in Proceedings of the IEEE, v62 n11 p1586-1598 Nov 74.

Descriptors: *Electromagnetic pulses, *Propagation, Spatial distribution, Time, Asymptotic series, Wave functions, Wave packets, Trajectories, Reprints.
Identifiers: Dispersive media, Lossy.

Asymptotic transient field solutions of the form A(r, t) exp(iS(r,t)), where S is a rapidly and A a slowly varying function of space and time, may be analyzed in terms of wave packets.

AD-A012 295/2GA PC$4.25/MF$2.25
National Bureau of Standards Boulder Colo Electromagnetics Div
Non-Planar Near Field Measurements: Spherical Scanning.
Final rept. Oct 73-Jul 74,
Paul F. Wacker. Apr 75, 70p AFAL-TR-75-38
Contract F33615-74-M-6001

Descriptors: Antenna radiation patterns, Near field, Fourier transformation, Data reduction, Far field, Computations.
Identifiers: Fast Fourier transform.

The advantages and limitations of near-field antenna measurements are compared with those of conventional far-field measurements. Further, the advantages and limitations of planar, circular cylindrical, and spherical scanning are compared.

N75-24430/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
On the Generalization of Kirchhoff Formula.
S. L. Sobolev. May 75, 12p NASA-TT-F-16332
Contract NASW-2481
Tran-Transl. Into English from Dokl. Akad. Nauk Sssr (Ussr), No. 6, 1933 p 256-262.

Descriptors: *Cauchy problem, *Kirchhoff law, *Wave equations, Numerical analysis, Poisson equation, Problem solving.

For abstract, see STAR 1315

21. PROPULSION AND FUELS

21B. Combustion and Ignition

AD-A012 361/2GA PC$3.75/MF$2.25
Purdue Univ Lafayette Ind Project Squid Headquarters
The Structure of Diffusion Flames.
Technical rept.,
R. W. Bilger. Jun 75, 42p Rept no. SQUID-TR-UCSD-7-PU
Contract N00014-67-A-0226-0005
Prepared in cooperation with California Univ., San Diego, La Jolla. Dept. of Applied Mechanics and Engineering Sciences.

Descriptors: *Turbulent flow, *Laminar flow, *Mixing, *Flames, Chemical reactions, Reaction kinetics, Mathematical models, Fluid flow.
Identifiers: *Diffusion flames, Squid project.

The theory for the mixing and chemical reaction of two streams of fluid is developed for unsteady laminar and for turbulent flow. Only one conserved scalar is required to fully describe the mixing and various reaction models are considered including the Burke-Schumann flame sheet and shifting equilibrium. A new expression is derived for the instantaneous reaction rate of any species. New insight is obtained into the structure of the instantaneous reaction zone for both laminar and turbulent flames. Diagnostic parameters are presented for determining when various models are applicable and for what properties.

N75-24162/0GA PC$4.75/MF$2.25
Michigan Univ., Ann Arbor. Space Physics Research Lab.
Assessment of Possible Environmental Effects of Space Shuttle Operations.
R. J. Cicerone, D. H. Stedman, R. S. Stolarski, A. N. Dingle, and R. A. Cellarius. Jun 73, 88p
NASA-CR-129003
Contract NAS8-28294

Descriptors: *Combustion products, *Environment effects, *Exhaust gases, *Space shuttles, Environment pollution, Man environment interactions, Solid propellant rocket engines.

For abstract, see STAR 1315

PB-242 597/3GA PC$8.50/MF$2.25
Georgia Inst. of Tech., Atlanta. School of Mechanical Engineering.
Study of Hazards from Burning Apparel and the Relations of Hazards to Test Methods.
Rept. no. 2 (Final),
A. Alkidas, E. R. Champion, W. E. Giddens, R. W. Hess, and B. Kumar. 31 Dec 72, 272p
NSF/RA/E-72-106
Grant NSF-GI-31882

Descriptors: *Fabrics, *Ignition, Acetate fibers, Cotton fabrics, Ignition lag, Thermophysical properties, Synthetic fibers, Nylon fibers, Polyester fibers, Heating, Thermal conductivity, Specific heat, Heat transfer, Density, Combustion, Optical properties, Activation energy, Mathematical models, Desorption, Gasification, Melting point, Enthalpy, Experimental design, Thermal analysis.

This experimental and analytical program has been carried out to predict the fabric ignition time as a function of exposure parameters and fabric properties. The ignition times of a selected set of cotton, nylon, polyester and acetate fabrics and blends were measured at well defined exposure and fabric conditions. The thermophysical properties which characterize the ignition process were also measured. These properties are the thermal conductance, the specific heat, the mass per unit area, the ignition or melting temperature, further the optical properties, namely infrared reflectance and transmittance, and the reaction kinetic parameters activation energy, pre-exponential factor and reaction enthalpy. In addition, the characterization of exposure conditions requires the measurement of the convective heat transfer film coefficients, for forced convection during gas flame ignition and for free convection losses during radiative heating. Fabric ignition time is predicted as a function of fabric properties and exposure conditions. The complete modeling analysis for the prediction of fabric ignition time was extended to include desorption and gasification processes. Partial modeling rules are discussed. Modeling experiments are specified which are required to predict ignition time.

PB-242 622/9GA PC$3.75/MF$2.25
Bureau of Mines, Pittsburgh, Pa. Pittsburgh Mining and Safety Research Center.
Chemical Flame Inhibition Using Molecular Beam Mass Spectrometry. Reaction Rates and Mechanisms in a 0.3 Percent CF3Br Inhibited Methane Flame.
Rept. of investigations,
Joan C. Biordi, Charles P. Lazzara, and John F. Papp. May 75, 49p BuMines-RI-8029

Descriptors: *Flames, *Inhibitors, Methane, Chemical composition, Free radicals, Temperature, Concentration(Composition), Fluoroalkanes, Bromoalkanes, Reaction kinetics, Profiles, Chemical reactions.
Identifiers: *Methane/bromo-trifluoro, Reaction rates.

Composition profiles for atomic, radical, and stable species, as well as temperature and area expansion ratio profiles, have been determined for a nearly stoichiometric CH4-O2-Ar flame and one to which 0.3% CF3Br inhibitor had been added. Net reaction rate profiles were calculated for all the observed species. For the normal flame, these and the mole fraction profiles gave rate coefficient information about the elementary reactions in the methane flame.

PB-242 688/0GA PC$6.25/MF$2.25
American Physical Society, Washington, D.C.
The Role of Physics in Combustion, An APS Study in Technical Aspects of Efficient Energy Utilization,
D. L. Hartley, D. R. Hardesty, M. Lapp, J. Dooher, and F. Dryer. Jan 75, 158p
Prepared in cooperation with National Science Foundation, Washington, D.C., Federal Energy Agency, Washington, D.C., and Electric Power Research Inst. Washington, D.C.

Descriptors: *Combustion, Catalysis, Gas flow, Reaction kinetics, Mathematical models, Turbulence, Pyrolysis, Nucleation, Beds(Process engineering), Molecular spectroscopy, Raman spectra, Probes, Rayleigh scattering, Optical equipment, Emulsions, Fuels, Emulsification.
Identifiers: Fluidized bed combustion, Catalytic combustion, Laser spectroscopy.

Three ways in which physics research can improve the understanding of combustion are explored: (1) Numerical modeling-Priority is assigned to fundamental work on models of turbulence, pyrolysis, and nucleation, and to the construction of compact kinetic mechanisms to simulate reliably the more extensive physical mechanisms in chemically reacting turbulent flows; (2) New diagnostic instrumentation-Attention is focused on optical measurements needed for current models, specifically laser doppler velocimetry (LDV) and Raman, Rayleigh, and particle (Mie) scattering. Priority areas identified include theoretical and experimental studies of Raman scattering from flame gases, combined Raman/LDV studies of turbulence, and quenching effects of fluorescence; (3) Unconventional combustion systems-Emulsified fuels are discussed as an example of the potential for new ideas to challenge the state of the art. Research areas include emulsification to achieve a range of objectives (stability, particle size), emulsion diagnostics, and exploration of the altered combustion process.

21C. Electric Propulsion

N75-23679/4GA PC$7.00/MF$2.25
TRW Systems Group, Redondo Beach, Calif. Electric Propulsion Dept.
Power Processor for a 30CM Ion Thruster.
Final Report, Nov. 1972 - May 1974.
J. J. Biess, and L. Y. Inouye. Oct 74, 198p NASA-CR-134785, TRW-20384-6002-RU-01
Contract NAS3-14383

Descriptors: *Design analysis, *Ion engines, *Power supply circuits, Breadboard models, Crystal rectifiers, Digital navigation, Electric propulsion, Inverters, Printed circuits, Solar generators, Spacecraft propulsion.

For abstract, see STAR 1315

N75-23682/8GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
Natural Environment Design Criteria for the Solar Electric Propulsion Stage (Seps).
J. J. Wright. 20 May 75, 16p NASA-TM-X-64929

Descriptors: *Aerospace environments, *Data correlation, *Solar electric propulsion, *Space missions, Electromagnetic radiation, Interplanetary magnetic fields, Ionosphere, Mission planning, Spacecraft environments.

For abstract, see STAR 1315

PB-242 686/4GA PC$4.75/MF$2.25
Mobility Systems Equipment Co., Los Angeles.
Test and Evaluation of an Eddy Current Clutch/Brake Propulsion System.
Final rept. Dec 72-Jul 74, on Phase 1,
George J. Adams. Feb 75, 98p DOT-TSC-UMTA-74-14, UMTA-MA-06-0027-74-2
Contract DOT-TSC-357
See also report on Phase 1 dated Oct 73, PB-225 093/4.

Descriptors: *Monorail railways, *Rapid transit railways, *Electric propulsion, Eddy currents, Eddy current brakes, Clutches, Electric drives, Speed control, Data processing.
Identifiers: Personal rapid transit, DOT/4DZ/DC.

This report covers the Phase II effort of a program to develop and test a 15 hp eddy-current clutch propulsion system. Included in the Phase 2 effort are the test and evaluation of the eddy-current clutch propulsion system on board a test vehicle. The test vehicle was designed and built to be compatible with an existing monorail track and was instrumented for the conduct of the test program.

21D. Fuels

AD-A012 245/7GA PC$4.25/MF$2.25
Air Force Aero Propulsion Lab Wright-Patterson AFB Ohio
Effect of Test Pressure on Fuel Thermal Stability Test Methods.
Final rept. Apr 73-Jul 74,
Royce P. Bradley, and Charles R. Martel. Apr 75, 51p Rept no. AFAPL-TR-74-81

Descriptors: *Jet engine fuels, *Thermal stability, *High pressure, Test methods, Pressure, Temperature, Bubbles, Boiling, Boiling point, Deposits, High temperature, Test equipment.
Identifiers: *JP-5 fuel, *JP-4 fuel, Jet fuel thermal oxidation tester.

The boiling of turbine fuels in contact with the metal surface of the Jet Fuel Thermal Oxidation Tester (JFTOT) test section was investigated. The boiling inception pressure was determined at several temperatures. Incipient boiling was determined by observing the pressure-temperature combination at which a power increase occurred in order to vaporize the fuel. A glass test housing was used to visually determine the bubble points of the fuels. The initiation of boiling was found to occur at the pressure-temperature combination where an increase in power was required to vaporize the fuel. Thus, the two techniques used produce identical results. The bubble points for various fuels were calculated using ASTM Method D-2889, Calculation of True Vapor Pressure of Petroleum Distillate Fuels. Good agreement exists between the measured bubble points and the calculated bubble points. Data is presented to show that boiling of the fuel may adversely affect the apparent thermal stability breakpoint of the fuel. It is recommended that the JFTOT operating pressure be increased from 400 psig to 500 psig to decrease the probability of fuel boiling in the JFTOT during a test. Based on lower operating pressure of the ASTM/CRC Fuel Coker, it is apparent that boiling of JP-4 and Jet B wide-cut fuels is likely under the current jet fuel test conditions of 300/400 F. Thus, the Fuel Coker thermal stability breakpoints of wide-cut fuels are likely to be in error. (Author)

N75-24105/9GA PC$4.25/MF$2.25
Barber-Colman Co., Irvine, Calif. Resources Recovery Systems.
Production of Gaseous Fuel by Pyrolysis of Municipal Solid Waste.
Final Report.
T. H. Crane, H. N. Ringer, and D. W. Bridges. 20 Mar 75, 65p NASA-CR-141791
Contract NAS9-14305

Descriptors: *Organic wastes (Fuel conversion), *Pyrolysis, *Waste energy utilization, Benzene, Fuels, Gasification, High temperature, Tars, Toluene.

For abstract, see STAR 1315

PB-242 476/0GA PC$3.25/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Resource Development.
Trends in Refinery Capacity and Utilization. Petroleum Refineries in the United States/Foreign Refinery Exporting Centers.
Semi-annual supplement,
Eugene Peer. Dec 74, 18p FEA/G-74/220
Interim Update to the Annual of June 1974 for U.S. Portion Only. See also PB-242 477.

Descriptors: *Refineries, *Petroleum industry, *Petroleum refining, Production capacity, Projects, Planning, Trends, Forecasting, United States, Crude oil, Tables(Data).

Tables are presented on petroleum refining capacity and actual crude runs (1960-78); new refineries, expansions, or reactivations scheduled in the U.S.; 1974 refinery capacity changes (operable refineries); and refineries planned but not constructed due to opposition on environmental grounds.

PB-242 477/8GA PC$3.75/MF$2.25
Federal Energy Administration, Washington, D.C. Office of Energy Resource Development.
Trends in Refinery Capacity and Utilization. Petroleum Refineries in the United States/Foreign Refinery Exporting Centers.
Annual rept.,
Eugene Peer. Jun 74, 44p FEA/B-74/15
See also PB-242 476.

Descriptors: *Refineries, *Petroleum industry, *Petroleum refining, Production capacity, Trends, Forecasting, United States, Canada, Italy, Planning, International trade, Petroleum product, Regions.
Identifiers: Caribbean region, Middle east region.

The report quantitatively evaluates the trend of growth of foreign refining capacity to export petroleum products and in particular to export them to the United States. This trend was compared with rate of growth of refinery capacity in the United States and the overall effect on the products import situation.

21E. Jet and Gas Turbine Engines

AD-A012 299/4GA PC$4.75/MF$2.25
Southwest Research Inst San Antonio Tex
Development of the AFAPL Engine Simulator Test for Lubricant Evaluation.
Interim technical rept. 1 Feb 73-31 Mar 75,
B. B. Baber, J. C. Tyler, and M. L. Valtierra. Jun 75, 90p Rept no. SwRI-RS-628 AFAPL-TR-75-38
Contract F33615-72-C-1097

Descriptors: *Gas turbines, *Lubrication, *Simulators, Lubricants, Combustion deposits, Seals, Correlation techniques.
Identifiers: J-57 engines.

A description of a gas turbine engine simulator, designated the AFAPL engine simulator, and a discussion of the results obtained using the simulator are presented. The AFAPL engine simulator was designed to provide a flexible test facility with the capability of closely simulating the critical temperatures and oil flow variables experienced by the lubricant in the full-scale engine. The No. 4-5 bearing compartment areas of a J57 turbine engine are used as the basic section of the simulator. The simulator is driven by a 100-hp variable-speed drive system through the accessory drive gearbox, providing simulator mainshaft speeds up to 10,000 rpm. Electrical resistance heaters are used to heat the air surrounding the oil-wetted areas within the No. 4-5 bearing compartment areas to the controlled test temperatures.

AD-A012 301/8GA PC$7.00/MF$2.25
Williams Research Corp Walled Lake Mich

Low Cost Jet Fuel Starter.
Final rept. 1 May-30 Nov 74,
David L. Murray. Dec 74, 185p AFAPL-TR-74-105
Contract F33615-74-C-2063

Descriptors: *Jet aircraft, *Engine starters, *Gas generator engines, Turbojet engines, Jet engine fuels, Solenoids, Fuel systems, Engineering drawings.

Williams Research Corporation executed a five month design study of a small low-cost gas turbine engine assembly which can be used for on-board starting of aircraft propulsion engines. This report describes the low-cost starter, its performance and the development tasks required to convert the design of reality.

AD-A012 302/6GA PC$4.25/MF$2.25
Hamilton Standard Windsor Locks Conn
Electro-Static Transducer Program.
Final technical rept. 1 May-31 Dec 74,
Richard K. Davenport. Jan 75, 65p Rept no. HSER-6703 AFAPL-TR-75-8
Contract F33615-74-C-2062

Descriptors: *Jet engines, *Temperature measuring instruments, *Transducers, Temperature sensitive elements, Electrostatic probes, Capacitance, Quartz, Thermal stresses.

This report describes the continuation of the development of a high temperature Electro-Static Displacement Transducer. The effort was commenced as described in Technical Report AFAPL-TR-73-86, dated October 19, 1973, for the Air Force Aero-Propulsion Laboratory, Wright-Patterson Air Force Base, Ohio. A problem which developed in the original testing was eliminated by redesign of the drive rod attachment to the transducer. A test piece incorporating the redesigned attachment was successfully tested to 1000F. The Electro-Static displacement transducer was then fabricated and subjected to room temperature and high temperature tests.

N75-23570/5GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Nasa Refan Program Status.
K. L. Abdalla, and J. A. Yuska. 1975, 35p NASA-TM-X-71705
Conf-Presented at the Air Transportation Meeting, Hartford, Conn., 6-8 May 1975; Sponsored by Soc. Of Automotive Eng.

Descriptors: *Engine design, *Engine noise, *Noise reduction, *Turbofan engines, Aircraft configurations, Engine tests, Flight tests.

For abstract, see STAR 1315

N75-23573/9GA PC$6.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
An Application of Modern Control Theory to Jet Propulsion Systems.
W. C. Merrill. May 75, 154p NASA-TM-X-71726
Contract NGR-36-010-024

Descriptors: *Airborne/spaceborne computers, *Engine control, *Turbojet engines, Air breathing engines, Aircraft equipment, Control theory, Jet propulsion.

For abstract, see STAR 1315

N75-23574/7GA PC$3.75/MF$2.25
National Gas Turbine Establishment, Pyestock (England).
Thrust/Drag Analysis for a Front Fan Nacelle Having Two Separate CO-Axial Exhaust Streams.
P. G. Street. 1975, 38p ARC-CP-1311, NGTE-321 Misc-Supersedes Ngte-321; Arc-34645.

Descriptors: *Coaxial flow, *Drag, *Exhaust gases, *Jet thrust, *Nacelles, Aerodynamic forces, Engine design, Jet engines.

For abstract, see STAR 1315

N75-23575/4GA PC$10.00/MF$2.25
Advisory Group for Aerospace Research and Development, Paris (France).
Power Plant Controls for AERO-Gas Turbine Engines.
Mar 75, 374p AGARD-CP-151
Conf-Presented at the 44TH Meeting of the AGARD Propulsion and Energetics Panel, Ustaoset, Norway, 9-13 Sep. 1974.
In English; Partly in French.

Descriptors: *Aircraft engines, *Control equipment, *Engine control, *Gas turbine engines, Digital simulation, Electronic control, Engine design, Fuel flow regulators, Hydromechanics, Reliability engineering, Thrust control.

For abstract, see STAR 1315

N75-23884/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Experimental Transient Turbine Blade Temperatures in a Research Engine for Gas Stream Temperatures Cycling Between 1067 and 1567 K.
D. J. Gauntner, and F. C. Yeh. Apr 75, 30p NASA-TM-X-71716, E-8328

Descriptors: *Turbine blades, *Turbojet engines, Air cooling, Gas streams, Inlet pressure, Research and development, Temperature profiles.

For abstract, see STAR 1315

N75-24106/7GA PC$4.25/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Aerodynamic Design of a Free Power Turbine for a 75 kw Gas Turbine Automotive Engine.
M. G. Kofskey, T. Katsanis, and L. F. Schumann. Apr 75, 62p NASA-TM-X-71714, E-8335

Descriptors: *Automobile engines, *Axial flow turbines, *Gas turbine engines, Aerodynamic characteristics, Engine design, Systems engineering.

For abstract, see STAR 1315

N75-24116/6GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
A Compressor Designed for the Energy Research and Development Agency Automotive Gas Turbine Program.
M. R. Galvas. May 75, 32p NASA-TM-X-71719, E-8365
Subm-Prepared in Cooperation with Army Air Mobility R and D Lab., Cleveland.

Descriptors: *Compressor efficiency, *Energy policy, *Gas turbine engines, Air pollution, Energy conservation, Fuel consumption, Pollution control.

For abstract, see STAR 1315

PAT-APPL-567 892/GA PC$3.25/MF$2.25
Department of the Air Force Washington D C
Bellcrank Assembly, Nozzle Actuator.
Patent Application,
L. E. Anders. Filed 14 Apr 75, 13p Rept no.
Government-owned invention available for licensing. Copy of application available NTIS.

Descriptors: *Mechanical components, *Turbojet engines, *Exhaust nozzles, Actuators, Crankshafts, Bearings, Thrust, Loads(Forces), Patents.
Identifiers: Bellcrank assemblies, *Patent applications, PAT-CL-74-469, Convergent flaps.

A bellcrank assembly is described in the patent application, adapted for mounting on, and actuating, a convergent flap of the exhaust nozzle of a turbojet engine. The unique structure of the assembly, unlike the prior art, transmits radial and bi-directional thrust loads to the flap utilizing low cost stamped and formed sheetmetal components, with the loads being transmitted directly into the skin of the flap. The bellcrank assembly is structured for external mounting on the convergent flap, thereby permitting easy inspection, maintenance and service, without the need to disassemble other nozzle hardware; and it includes angular contact bearings with cross-corner path arrangement, bellcrank link arms, and a bellcrank actuator arm which actually physically comprise the housing of the bellcrank.

21F. Nuclear Propulsion

AD-A011 982/6GA PC$5.25/MF$2.25
Aerospace Research Labs Wright-Patterson AFB Ohio
An Experimental Investigation of Heat Transfer in a Rotating Fluidized Bed.
Final rept. Jan 72-Oct 73,
James M. Howard, II. May 75, 110p Rept no. ARL-75-0115
See also AD-729 727.

Descriptors: *Nuclear propulsion, *Nuclear reactors, *Fluidized bed processors, Fluid flow, Vortices, Two phase flow, Heat transfer, Gas flow.
Identifiers: *Colloid core reactors.

An in depth study of the heat transfer characteristics of a rotating fluidized bed has been conducted and comparisons made with the results of a similar study of the heat transfer characteristics of a columnar bed. The heat transfer results for the rotating fluidized bed have been extrapolated to several previously described colloid core nuclear reactor designs to predict operating temperatures and particle-gas temperature differentials. It has been concluded that the rotating fluidized bed exhibits much better heat transfer than a columnar fluidized bed for similar flow conditions. Results for the rotating fluidized bed indicate that its operation may be varied so as to tailor its heat transfer characteristics to specific applications. Extrapolation to the colloid core nuclear reactor indicates operating temperatures around 3750K and particle-gas temperature differentials of less than 100K for a variety of operating conditions.

21G. Reciprocating Engines

N75-24544/9GA PC$4.75/MF$2.25
National Aeronautics and Space Administration. Marshall Space Flight Center, Huntsville, Ala.
System Analysis of a Piston Steam Engine Employing the Uniflow Principle, a Study in Optimized Performance.
J. A. Peoples. May 75, 76p NASA-TM-X-66818, M-TU-75-5

Descriptors: *Optimization, *Piston engines, *Uniform flow, Engine design, Mathematical models, Systems analysis.

For abstract, see STAR 1315

21H. Rocket Motors and Engines

AD-A012 200/2GA PC$7.00/MF$2.25
Air Force Rocket Propulsion Lab Edwards AFB Calif
Preliminary Flight Rating Tests of the HAST Propulsion System.
Final rept. Jun 72-Dec 73,
Carlton D. Penn, and John E. Branigan. Jan 75, 199p Rept no. AFRPL-TR-75-5

Descriptors: *Hybrid rocket engines, *Hybrid propulsion, *Aerial targets, *Guided missiles, Flight testing, Liquid rocket oxidizers, Solid rocket fuels, Nitric acid, Polybutadiene, Acrylic resins, Fuel systems, Thrust control, Systems engineering, Expulsion, Pressure regulators, Corrosion, Storage, Supersonic aircraft, Pumps, Bearings, Seals, Performance(Engineering), High altitude, Simulation.
Identifiers: High altitude supersonic targets, HAST(High altitude supersonic targets), *Target missiles.

Preliminary Flight Rating Tests of the hybrid rocket propulsion system for the HAST target missile were accomplished by the Air Force Rocket Propulsion Laboratory. Nine tests of the flight configuration system were conducted at simulated altitude. Overall operating characteristics and performance were shown to be satisfactory for missile flight tests.

N75-23676/0GA PC$9.25/MF$2.25
IIT Research Inst., Chicago, Ill.
Attitude Control Propulsion Components, Volume 1.
Nov 74, 309p NASA-CR-136741-VOL-1
Contracts NAS7-100, JPL-953830
Subm-Prepared for JPL.

Descriptors: *Attitude control, *Propulsion system configurations, *Rocket engine design, Solid rocket propellants, Systems engineering, Thrust vector control.

For abstract, see STAR 1315

N75-23684/4GA PC$5.25/MF$2.25
Martin Marietta Corp., Denver, Colo.
Acquisition System Environmental Effects Study.
Final Report.
May 75, 118p NASA-CR-120768, MCR-75-21
Contract NAS8-30592

Descriptors: *Capillary flow, *Environment effects, *Propellant storability, Feed systems, Fluid dynamics, Fluid filters, Reduced gravity, Resistance heating, Vibration effects.

For abstract, see STAR 1315

21I. Rocket Propellants

AD-A012 108/7GA PC$6.25/MF$2.25
Ogden Air Logistics Center Hill AFB Utah Propellant Lab Section
Propellant Surveillance Report, LGM-30 F and G, Stage 1, Phase B, Series II, TP-H1011.
Semi-annual test results,
John A. Thompson. Apr 75, 162p Rept no. MANCP-321(75)
See also report dated Jan 75, AD-A007 036.

Descriptors: *Surface to surface missiles, *Solid rocket propellants, *Aging(Materials), Stress testing, Strain rate, Tensile properties, Regression analysis, Statistical data.
Identifiers: Minuteman, Minuteman 2 missiles, Minuteman 3 missiles, LGM-30 missiles, LGM-30G missiles, LGM-30F missiles, First stage engines.

This report contains propellant test results from cartons of TP-H1011 bulk propellant representing LGM-30 F and G First Stage Minuteman Motors. This report uses a statistical approach to analyze the bulk carton propellant data. Testing was accomplished in accordance with MMEMP Project M52258M, DO 12 Nr 3MP123P, 74NE458. The data from this test period are combined with data from previous testing and entered into the GO85 computer for storage, analysis, and regression analysis. From the statistical analysis of all data tested to date (9 1/2 years for F and G), significant degradation of the propellant does not appear likely for at least two years past the oldest data point. Each point on the regression plot represents the mean of all samples at that particular age. The number of samples at each point is indicated on the sample size summary sheet on the page accompanying each regression plot. The data range at any age can be found by suitable inquiry of the G085 system.

AD-A012 213/5GA PC$10.50/MF$2.25
Aerojet Solid Propulsion Co Sacramento Calif
Development of a Solid Rocket Propellant Nonlinear Constitutive Theory.
Final rept. May 73-Jul 74,
Richard J. Farris, Leonard R. Herrmann, James R. Hutchinson, and Richard A. Schapery. May 75, 404p Rept no. ASPC-1074-26F AFRPL-TR-75-20
Contract F04611-73-C-0060
See also Volume 1, dated Jun 73, AD-769 264. Volume 2 dated Jun 73, Ad-769 263. Prepared in cooperation with California Univ., Davis., and Texas A and M Univ., College Station.

Descriptors: *Solid rocket propellants, *Viscoelasticity, Stress strain relations, Dynamic response, Failure, Deformation, Finite element analysis, Computer programming, Nonlinear systems, FORTRAN.
Identifiers: FORTRAN 4 programming language.

The objective of this program was to develop and demonstrate the accuracy of totally computerized response and failure characterizations and finite element stress and deformation analyses of propellant systems. These analyses were to be based on the nonlinear viscoelastic constitutive theory developed on earlier Air Force and Navy contracts. To meet these objectives, the work to be accomplished was divided into four distinct tasks. Tasks I and III were development tasks wherein the computerized characterization and finite element programs were defined, coded and assembled. Tasks II and IV were demonstration tasks wherein the developments of Tasks I and III were evaluated in realistic situations. The technical discussion of this report provides a detailed description of the work performed to meet the objectives of this program. Also included under separate headings are the descriptions of each computer code, its function, and sample problems.

N75-23677/8GA PC$8.75/MF$2.25
IIT Research Inst., Chicago, Ill.
Attitude Control Propulsion Components, Volume 2.
Nov 74, 288p NASA-CR-136741-VOL-2
Contracts NAS7-100, JPL-953830
Subm-Prepared for JPL.

Descriptors: *Attitude control, *Propulsion system configurations, *Rocket engine design, *Solid rocket propellants, Equipment specifications, Systems engineering, Thrust vector control.

For abstract, see STAR 1315

22. SPACE TECHNOLOGY

22A. Astronautics

N75-23515/0GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Ames Research Center, Moffett Field, Calif.
Viking Entry Vehicle Aerodynamics at M Equals 2 in Air and Some Preliminary Test Data for Flight in CO2.
R. I. Sammonds, and R. L. Kruse. Jun 75, 26p NASA-TN-D-7974, A-4825

Descriptors: *Carbon dioxide, *Viking 75 entry vehicle, Aerodynamic characteristics, Aerodynamic drag, Mars atmosphere.

For abstract, see STAR 1315

N75-23621/6GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
The APOLLO-Soyuz Test Flight.
A. A. Leonov. Jun 75, 9p NASA-TT-F-16386
Contract NASW-2481
Tran-Transl. Into English from Zemlya I Vselennaya (Ussr), No. 2, Mar.-Apr. 1974 p 13-17.

Descriptors: *Apollo soyuz test project, *Mission planning, Astronaut training, Cosmonauts, Spacecraft components.

For abstract, see STAR 1315

N75-23622/4GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
The Soyuz and APOLLO Spacecraft.
I. Yudin. Jun 75, 22p NASA-TT-F-16371
Contract NASW-2481
Tran-Transl. Into English from Nauka Zhin (Ussr), No. 3, Mar. 1975 p 36-43.

Descriptors: *Apollo soyuz test project, *Spacecraft components, Apollo spacecraft, International cooperation, Mooring, Multiple docking adapters, Soyuz spacecraft, Spacecraft cabins, Spacecraft modules.

For abstract, see STAR 1315

N75-23625/7GA PC$5.75/MF$2.25
Joint Publications Research Service, Arlington, Va.
In Outer Space.
I. G. Borisenko. May 75, 126p NASA-TT-F-16252
NASA ORDER W-13183
Tran-Transl. Into English from the Book "V. Otkrytom Kosmose" Moscow, Mashinostroyeniye Press, 1974 p 1-159.

Descriptors: *Histories, *Literature, *Space exploration, Astronaut training, Cosmonauts.

For abstract, see STAR 1315

N75-23637/2GA PC$10.00/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Essentials of the Theory of Flight and Elements of Designing Artificial Earth Satellites.
M. K. Tikhonravov, I. K. Bazhinov, O. V. Gurko, G. Y. Maksimov, and I. M. Yatsunskiy. Jun 75, 365p NASA-TT-F-16220
Contract NASW-2481
Tran-Transl. Into English of the Book "Osnovy Teorii Poleta I Elementy Proyektirovaniya Iskusstvennykh Sputnikov Zemli" Moscow, Mashinostroyeniye Press, 1974 p 1-331. Misc-Revised.

Descriptors: *Flight mechanics, *Orbital mechanics, *Satellite design, Gravitational effects, Perturbation theory.

For abstract, see STAR 1315

N75-23644/8GA PC$3.75/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Report to the Administrator by the NASA Aerospace Safety Advisory Panel on the Skylab Program. Volume 1: Summary Report.
Jan 73, 42p NASA-TM-X-66814
Seri-2.

Descriptors: *Design analysis, *Safety management, *Skylab program, *Systems management, Project management, Quality control, Technology assessment.

For abstract, see STAR 1315

N75-23645/5GA PC$7.00/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Report to the Administrator by the NASA Aerospace Safety Advisory Panel on the Skylab Program. Volume 2: Program Implementation and Maturity.
Jan 73, 180p NASA-TM-X-66815
Seri-2.

Descriptors: *Design analysis, *Safety management, *Skylab program, *Systems management, Project management, Quality control, Technology assessment.

For abstract, see STAR 1315

N75-23646/3GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
The Soyuz: Ready for Flight.
A. Filipchenko. Jun 75, 9p NASA-TT-F-16369
Contract NASW-2481
Tran-Transl. Into English from Aviat. Kosmonavt. (Ussr), No. 3, Mar. 1975 p 38-39.

Descriptors: *Apollo soyuz test project, *Soyuz spacecraft, Compatibility, Flight tests, International cooperation, Orbital rendezvous, Spacecraft docking.

For abstract, see STAR 1315

N75-23651/3GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Langley Research Center, Langley Station, Va.
Abort Separation Study of a Shuttle Orbiter and External Tank at Hypersonic Speeds.
P. T. Bernot. May 75, 49p NASA-TM-X-3212, L-10073

Descriptors: *Aborted missions, *Space shuttle orbiters, *Stage separation, *Supersonic speeds, Abort trajectories, Aerodynamic characteristics, Computerized simulation, Spacecraft reliability, Spacecraft stability, Wind tunnel tests.

For abstract, see STAR 1315

N75-23670/3GA PC$3.75/MF$2.25
European Space Research and Technology Center, Noordwijk (Netherlands).
Dynamic Analysis of a Satellite with Deformable Parts.
D. H. L. Poelaert. Oct 74, 50p ESRO-SR-22-ESTEC

Descriptors: *Dynamic models, *Elastic deformation, *Euler-lagrange equation, *Satellite configurations, Eigenvalues, Flexible bodies, Geos satellites (Esro), Numerical analysis, Rigid structures, Rotating bodies, Satellite attitude control, Structural vibration, Systems analysis, Vibration mode.

For abstract, see STAR 1315

N75-23671/1GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Pressures and Elevations from CO2 Band Intensities Based on Measurements Made on Board the MARS-5 Automatic Interplanetary Station (Preliminary Results).
L. V. Ksanfomaliti, B. S. Kunashev, and V. I. Moroz. May 75, 8p NASA-TT-F-16346
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled., V. 13, No. 1, Jan.-Feb. 1975 p 84-86.

Descriptors: *Carbon dioxide, *Interplanetary spacecraft, *Laser altimeters, *Mars atmosphere, Absorption spectra, Automatic gain control, Cassegrain antennas, Molecular absorption, U.s.s.r. space program.

For abstract, see STAR 1315

N75-23673/7GA PC$7.00/MF$2.25
Bendix Corp., Teterboro, N.J. Guidance Systems Div.
Atm Cmg/Epea.
Final Summary Report.
R. Abramowitz, J. Kovek, W. Teimer, and S. P. Haddad. 1975, 188p NASA-CR-120760
Contract NAS8-20661

Descriptors: *Apollo telescope mount, *Attitude control, *Control moment gyroscopes, Analog computers, Block diagrams, Computer design, Systems engineering.

For abstract, see STAR 1315

N75-23933/5GA PC$3.75/MF$2.25
Bendix Corp., Ann Arbor, Mich. Aerospace Systems Div.
Laser Geodynamic Satellite Thermal/Optical/Vibrational Analyses and Testing. Volume 1: Executive Summary.
Final Report.
Jan 75, 26p NASA-CR-120754, BSR-4175-VOL-1-ADD
Contract NAS8-30658
Seri-2.

Descriptors: *Lageos (Satellite), *Optical activity, *Retroreflection, *Vibration tests, Data acquisition, Experimental design, Performance tests, Tables (Data).

For abstract, see STAR 1315

N75-23934/3GA PC$7.25/MF$2.25
Bendix Corp., Ann Arbor, Mich. Aerospace Systems Div.
Laser Geodynamic Satellite Thermal/Optical/Vibrational Analyses and Testing, Volume 2, Book 1 Technical Report.
Final Report.
Jan 75, 214p NASA-CR-120755, BSR-4175-VOL-2-BK-1-ADD
Contract NAS8-30658
Seri-2.

Descriptors: *Lageos (Satellite), *Optical activity, *Retroreflection, *Vibration tests, Graphs (Charts), Laser applications, Performance prediction, Performance tests, Product development, Tables (Data).

For abstract, see STAR 1315

N75-23935/0GA PC$7.50/MF$2.25
Bendix Corp., Ann Arbor, Mich. Aerospace Systems Div.
Laser Geodynamic Satellite Thermal/Optical/Vibrational Analysis and Testing, Volume 2, Book 2.
Final Report.
9 May 75, 237p NASA-CR-120756, BSR-4175-VOL-2-BK-2-ADD
Contract NAS8-30658
Seri-2.

Descriptors: *Cubes (Mathematics), *Far fields, *Lageos (Satellite), *Optical activity, *Vibration tests, Dihedral angle, Energy distribution, Graphs (Charts), Polarization characteristics, Tables (Data).

For abstract, see STAR 1315

N75-24641/3GA PC$3.25/MF$2.25
National Aeronautics and Space Administration. John F. Kennedy Space Center, Cocoa Beach, Fla.
History of Manned Space Flight.
Feb 75, 15p NASA-TM-X-66817

Descriptors: *Apollo project, *Gemini project, *Mercury project, *Skylab program, Astronauts, Costs, Manned space flight, Missions, Saturn launch vehicles, Spacecraft orbits.

For abstract, see STAR 1315

22B. Spacecraft

N75-23620/8GA PC$4.25/MF$2.25
Aerospace Corp., El Segundo, Calif.
Manned Systems Utilization Anaylsis. Study 2.1: Space Servicing Pilot Program Study.
R. R. Wolfe. 30 Jan 75, 54p NASA-CR-142758, ATR-75(7361)-1
Contract NASW-2727

Descriptors: *Manned spacecraft, *Payloads, *Space maintenance, Cost estimates, Flight tests, Man machine systems, Project planning, Space tugs, Spacecraft performance.

For abstract, see STAR 1315

N75-23626/5GA PC$3.75/MF$2.25
Hydromecanique et Frottement, Andrezieux (France). Centre Stephanois de Recherches Mecaniques.
Possible Applications of Surface Treatment to Ultrahigh Vacuum Friction for Space Utilization Possibilites d'Applications des Traitements de Surface au Frottement Sous Ultra-Vide pour Utilisations Spatiales.
J. L. Polti. 1975, 27p
Subm-Sponsored by Cnes. Conf-Presented at the European Space Tribology Symp., Frascati, Italy, 9-11 Apr. 1975.
Language in French.

Descriptors: *Dry friction, *Spacecraft environments, *Surface finishing, *Ultrahigh vacuum, Friction reduction, Solid lubricants, Surface diffusion, Surface layers.

For abstract, see STAR 1315

N75-23627/3GA PC$13.00/MF$2.25
International Business Machines Corp., Huntsville, Ala.
Astrionic System Optimization and Modular Astrionics for NASA Missions after 1974. Preliminary Definition of Astrionic System for Space Tug Mission Vehicle Payload (Mvp).
Progress Report, 16 Jun. - 15 Aug. 1970.
15 Aug 70, 563p NASA-CR-120618, IBM-69-K44-0006H
Contract NAS6-14000

Descriptors: *Astrionics, *Mission planning, *Payloads, *Space tugs, Optimization, Spacecraft design, Systems engineering.

For abstract, see STAR 1315

N75-23650/5GA PC$17.25/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Airloads Investigation of an 0.030 Scale Model of the Space Shuttle Vehicle 140A/B Orbiter Configuration (Model 47-0) in the Arc

9 by 7-Foot Unitary Plan Wind Tunnel for Mach 1.55 and 2.2 (Oa22b).
R. L. Gillins. Apr 75, 762p NASA-CR-141530, DMS-DR-2131
Contract NAS9-13247

Descriptors: *Launch vehicle configurations, *Space shuttle orbiters, *Wind tunnel models, Aerodynamic loads, Angle of attack, Booster rocket engines, Pressure distribution, Sideslip, Wing tanks.

For abstract, see STAR 1315

N75-23659/6GA PC$21.25/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Airloads Investigation of an 0.30-Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 5.
R. L. Gillins. Mar 75, 957p NASA-CR-134447, DMS-DR-2084-VOL-5
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23660/4GA PC$21.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030-Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 6.
R. L. Gillins. Mar 75, 956p NASA-CR-134448, DMS-DR-2084-VOL-6
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23661/2GA PC$15.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030 Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 7.
R. L. Gillins. Mar 75, 685p NASA-CR-134449, DMS-DR-2084-VOL-7
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23662/0GA PC$15.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030-Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 8.
R. L. Gillins. Mar 75, 608p NASA-CR-134450, DMS-DR-2084-VOL-8
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23663/8GA PC$17.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030-Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 9.
R. L. Gillins. Mar 75, 789p NASA-CR-141501, DMS-DR-2084-VOL-9
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23664/6GA PC$19.25/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030-Scale Model of the Space Shuttle Vehicle 140 a/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 10.
R. L. Gillins. Mar 75, 853p NASA-CR-141502, DMS-DR-2084-VOL-10
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23665/3GA PC$12.50/MF$2.25
Chrysler Corp., New Orleans, La. Data Management Services.
Airloads Investigation of an 0.030-Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 11-Foot Unitary Plan Wind Tunnel for Mach Range 0.6 to 1.4 (Ia14a), Volume 11.
R. L. Gillins. Mar 75, 544p NASA-CR-141503, DMS-DR-2084-VOL-11
Contract NAS9-13247
Seri-11.

Descriptors: *Aerodynamic loads, *Launch vehicle configurations, *Space shuttles, *Wind tunnel tests, Aerodynamic stability, Angle of attack, Mach number, Wind tunnels.

For abstract, see STAR 1315

N75-23666/1GA PC$10.25/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Results of Transonic Wind Tunnel Tests on an 0.010-Scale Space Shuttle Mated Vehicle Model 72-Ots in the Larc 8-Foot Tpt (IA43).
M. T. Petrozzi, and M. D. Milam. Apr 75, 397p NASA-CR-141525, DMS-DR-2204
Contract NAS9-13247

Descriptors: *Space shuttles, *Transonic wind tunnels, *Wind tunnel tests, Aerodynamic forces, Angle of attack, Wing loading.

For abstract, see STAR 1315

N75-23680/2GA PC$6.25/MF$2.25
Rocketdyne, Canoga Park, Calif.
Hydrazine Gas Generator Program.
Final Report.
L. Kusak, and R. Marcy. Mar 75, 152p NASA-CR-141795, R-9690
Contract NAS9-13003

Descriptors: *Gas generators, *Hydrazines, *Space shuttles, Design analysis, Stress analysis, Structural analysis.

For abstract, see STAR 1315

N75-23685/1GA PC$5.75/MF$2.25
General Dynamics/Convair, San Diego, Calif.
Space LOX Vent System.
Final Report.
R. C. Erickson. 30 Apr 75, 133p NASA-CR-120769, CASD-NAS-75-021
Contract NAS8-26972

Descriptors: *Space shuttle orbiters, *Vents, Dielectrics, Equipment specifications, Flow velocity, Heat exchangers, Surface properties.

For abstract, see STAR 1315

N75-23985/5GA PC$3.75/MF$2.25
Battelle Columbus Labs., Ohio.
Fabrication and Evaluation of an OSO-1 Type Baseplate.
Final Report.
C. W. Marschall. 6 May 75, 46p NASA-CR-143794
Contract NAS5-11411

Descriptors: *Dimensional stability, *Oso-1, *Rectangular plates, Equipment specifications, Experimental design, Solar spectrometers, Temperature effects, Thermal expansion, Vibrational stress.

For abstract, see STAR 1315

N75-24362/6GA PC$5.25/MF$2.25
Jet Propulsion Lab., Calif. Inst. of Tech., Pasadena.
Planetary Quarantine: Supporting Research and Technology.
Semiannual Review, 1 Jul. - 31 Dec. 1974.
D. M. Taylor. 18 Apr 75, 119p NASA-CR-142878, JPL-900-710
Contract NAS7-100

Descriptors: *Planetary quarantine, *Spacecraft sterilization, Chromatography, Decontamination, Microorganisms, Teflon (Trademark).

For abstract, see STAR 1315

N75-24654/6GA PC$7.50/MF$2.25
National Aeronautics and Space Administration, Washington, D.C.
Korolev: A Chronicle.
Y. Golovanov. Apr 75, 231p NASA-TT-F-16278
Tran-Transl. Into English from the Book "Korolev: Khronika" Moscow, Molodaya Gvardiya, 1973 p 1-254.

Descriptors: *Biography, *Spacecraft design, *U.s.s.r. space program, Aircraft design, Histories, Rocket vehicles.

For abstract, see STAR 1315

22C. Spacecraft Trajectories and Reentry

N75-23630/7GA PC$8.50/MF$2.25
General Electric Co., Beltsville, Md. GE LANDSAT Operation Control Center.
Landsat-2 Launch and Flight Activation. Launch Through Orbit 50 and Orbit Adjust Operation.
Evaluation Report, 22-26 Jan. 1975.
21 Mar 75, 263p NASA-CR-143744, DOC-75SD4215
Contract NAS5-21808

Descriptors: *Data processing, *Landsat 2, *Postflight analysis, *Telemetry, Earth resources program, Multispectral band scanners, Radio relay systems, Systems engineering.

For abstract, see STAR 1315

N75-23631/5GA PC$3.25/MF$2.25
Kanner (Leo) Associates, Redwood City, Calif.
Operation of Descent Module of the MARS-6 Automatic Interplanetary Station in the Martian Atmosphere.
S. S. Sokolov, V. G. Fokin, V. P. Burtsev, R. S. Romanov, and M. K. Rozhdestvenskiy. May 75, 12p NASA-TT-F-16334
Contract NASW-2481
Tran-Transl. Into English from Kosm. Issled. (Ussr), V. 13, No. 1, Jan.-Feb. 1975 p 9-15.

Descriptors: *Landing modules, *Mars atmosphere, *Mars 6 spacecraft, Aerodynamic brakes, Atmospheric entry, Descent trajectories, Interplanetary flight, Parachute descent.

For abstract, see STAR 1315

N75-23632/3GA PC$3.75/MF$2.25
Westinghouse Electric Corp., Baltimore, Md. Systems Development Div.
Analysis of Rae-B Attitude Data.
Final Report.
D. A. Hedland, and P. K. Degonia. 1975, 31p NASA-CR-143793
Contract NAS5-20083

Descriptors: *Attitude (Inclination), *Explorer 49 satellite, *Orbital mechanics, Computerized simulation, Data smoothing.

For abstract, see STAR 1315

N75-23635/6GA PC$3.75/MF$2.25
Analytical Mechanics Associates, Inc., Seabrook, Md.
Study to Document Low Thrust Trajectory Optimization Programs Hiltop and Astop.
J. L. Horsewood, F. I. Mann, and S. Pines. Dec 74, 36p NASA-CR-120767, AMA-74-32
Contract NAS8-29945

Descriptors: *Computer programs, *Thrust programming, *Trajectory control, Computer programming, Flight optimization.

For abstract, see STAR 1315

N75-23638/0GA PC$5.75/MF$2.25
European Space Research Organization, Paris (France).
Contributions to the Calculation of Satellite Transfer from Near-Earth to Geostationary Orbits by Small Thrust-Acceleration in Regularised Variables.
Feb 75, 150p ESRO-TT-138, DLR-FB-74-57
Tran-Transl. Into English of 'Beitr. Zur Berechnung von Satellitenuebergaengen Aus Erdnahen Parkbahnen in die Geostationaere Lage bei Schwacher Schubbeschleunigung in Regularisierten Variablen'' Dfvlr, Porz, West Ger. Report Dlr-FB-74-57, 22 Jul. 1974. Misc-Original German Report Available from Dfvlr, Porz, West Ger. 34 Dm.

Descriptors: *Orbit calculation, *Spacecraft maneuvers, *Thrust, *Transfer orbits, Acceleration (Physics), Dependent variables, Equations of motion, Independent variables, Parking orbits, Stationary orbits.

For abstract, see STAR 1315

N75-23639/8GA PC$3.75/MF$2.25
European Space Operations Center, Darmstadt (West Germany).
Perturbation of a Planetary Orbiter by Radiation Pressure, Account Being Taken of Variation in the Distance and Direction of the Sun.
E. A. Roth. Nov 74, 26p ESRO-SR-24-ESOC

Descriptors: *Mercury (Planet), *Orbit calculation, *Radiation, *Radiation pressure, *Satellite perturbation, Disturbing functions, Euler-lagrange equation, Recursive functions, Solar position, Three body problem.

For abstract, see STAR 1315

N75-23656/2GA PC$3.75/MF$2.25
National Aeronautics and Space Administration. Goddard Space Flight Center, Greenbelt, Md.
Results of the 3 November 1974 Applications Technology Satellite-6 (Ats-6) Trilateration Test.
P. E. Schmid, and J. J. Lynn. Apr 75, 33p NASA-TM-X-70897, X-932-75-104
Subm-Submitted for Publication.

Descriptors: *Ats 6, *Spacecraft tracking, *Synchronous satellites, *Transponders, Ats 3, Data processing, Data transmission, Orbit calculation, Orbital position estimation.

For abstract, see STAR 1315

22D. Spacecraft Launch Vehicles and Ground Support

N75-23647/1GA PC$12.50/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Airloads Investigation of an 0.030 Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 9 by 7 Foot Unitary Plan Wind Tunnel for Mach 1.55 and 2.2 (Ia14b), Volume 1.
R. L. Gillins. Apr 75, 549p NASA-CR-141522, DMS-DR-2129-VOL-1
Contract NAS9-13247
Seri-2.

Descriptors: *Launch vehicle configurations, *Space shuttle orbiters, *Wind tunnel models, Aerodynamic loads, Angle of attack, Booster rocket engines, Pressure distribution, Sideslip, Wing tanks.

For abstract, see STAR 1315

N75-23648/9GA PC$19.25/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Airloads Investigation of an 0.030 Scale Model of the Space Shuttle Vehicle 140A/B Launch Configuration (Model 47-Ots) in the Arc 9 by 7 Foot Unitary Plan Wind Tunnel for Mach 1.55 and 2.2 (Ia14b), Volume 2.
R. L. Gillins. Apr 75, 806p 0NASA-CR-141523, 0DMS-DR-2129-VOL-2
Contract 0NAS9-132470
Seri-2.

Descriptors: *Launch vehicle configurations, *Space shuttle orbiters, *Wind tunnel models, Aerodynamic loads, Angle of attack, Booster rocket engines, Pressure distribution, Sideslip, Wing tanks.

For abstract, see STAR 1315

N75-23649/7GA PC$17.25/MF$2.25
Chrysler Corp., New Orleans, La. Space Div.
Airloads Investigation of an 0.030 Scale Model of the Space Shuttle Vehicle 140A/B Orbiter Configuration (Model 47-0) in the 11-Foot Unitary Plan Wind Tunnel for Mach 0.6 and 0.9 (0A22A).
R. L. Gillins. Apr 75, 709p 0NASA-CR-1415290
Contract 0NAS9-132470

Descriptors: *Launch vehicle configurations, *Space shuttle orbiters, *Wind tunnel models, Aerodynamic loads, Angle of attack, Booster rocket engines, Pressure distribution, Sideslip, Wing tanks.

For abstract, see STAR 1315

N75-23669/5GA PC$7.50/MF$2.25
National Aeronautics and Space Administration. Lewis Research Center, Cleveland, Ohio.
Centaur Standard Shroud (Css) Static Limit Load Structural Tests.
C. Eastwood. Apr 75, 232p 0NASA-TM-X-717270

Descriptors: *Centaur launch vehicle, *Static loads, *Structural strain, Aging (Materials), Deflection, Design analysis, Flight tests, Mechanical properties, Shrouds, Thermal insulation.

For abstract, see STAR 1315

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